



<b>Paramedical program</b>	
<b>Specialization</b>	<b>Pharmacy</b>
<b>Course number</b>	<b>020805221</b>
<b>Course title</b>	<b>Pharmacology 2</b>
<b>Credit hours</b>	<b>3</b>
<b>Theoretical hours</b>	<b>2</b>
<b>Practical hours</b>	<b>3</b>



## Brief Course Description:

This course aimed to study drugs (mechanism of action, therapeutics, pharmacological effects, precaution, side effect, toxicity) of central nervous system, respiratory system, gastrointestinal drugs, histamines and antihistamines, dermatology drugs and nutrients (vitamins and minerals).

## Course Objectives:

Upon the completion of the course, the student will be able to:

1. To study drugs that affect CNS
2. Drugs affecting respiratory system.
3. Drugs affecting gastrointestinal tract
4. Identify histamines and antihistamines.
5. To study dermatology drugs and Nutrients (vitamins, proteins...)
6. Know his/her role as a pharmacist assistant (as one of health care providers) and how he/she could improve patient knowledge about drugs.
7. Effectively communicate with patients about the effectiveness and safety of drugs that affect ANS, CV system



**Detailed Course Description:**

Unit number	Unit subject	Unit content
1.	<b>Drugs affect the central nervous system</b>	<ul style="list-style-type: none"> <li>▪ Introduction to the nervous system .</li> <li>▪ Neurotransmitter of the central nervous system</li> <li>▪ Drugs that affect CNS (action, indication, main side effect , contraindication)                             <ul style="list-style-type: none"> <li>- General anesthesia( preanesthetic medications , stages of anesthesia ,types of anesthesia ,IV anesthetic drugs (propofol ,thiopental ,etomidate, ketamine ,diazepam ) maintenance or inhalational anesthesia (chloroform , diethyl ether , cyclopropane, nitrous oxide ,halothane , enflurane , isoflurane , desflurane , sevoflurane .</li> <li>- Local anesthesia (administration routes , types , uses , side effects .</li> </ul> </li> </ul> <p>(surface applied (cocaine, benzocaine ) , injected anesthesia ( procaine , lidocaine , bupivacaine ))</p> <ul style="list-style-type: none"> <li>- Skeletal Muscle Relaxant ( neuromuscular blockers or peripherally acting ,centrally acting drugs , direct acting drugs ) the action , indication ,side effect of ( tubocurarine ,succinylchlorine , gallamine ,benzodiazepines , baclofen , orphenandrine , tizanidine , mephenisin , botulinium toxin, dantrolene)</li> <li>- Sedatives and hypnotics the action , uses and side-effects of ( barbiturate , benzodiazepines , and other miscellaneous drugs used for sedation .</li> <li>- Narcotic Analgesics, opioids (the action , uses and side effects , and classification of opioids ( agonists , antagonists ).</li> </ul> <p>Opioids : natural ( codeine, morphine , thebaine , narcotine ,papaverine) , semisynthetic (hydromorphone , heroine ) , and synthetic ( dextropropoxyphene , fentanyl , pethidine , pentazocine , methadone )</p> <ul style="list-style-type: none"> <li>- Non- Narcotic Analgesics : the action , uses , side effect and dosing of (paracetamol )</li> <li>- Non-steroidal anti-inflammatory drugs : the action ,uses , side effect and classification of NSAIDS ( COX 1 , COX 2 inhibitors )</li> <li>- Anti- depressant drugs ( classification of antidepressants , the action , uses , side effects of (tricyclic antidepressant( amitriptyline , clomipramine , imipramine, nortriptyline ) ,monoaminoxidase</li> </ul>



		<p>inhibitors ( isocarboxide , selective serotonin reuptake inhibitors )</p> <ul style="list-style-type: none"> <li>- Anti psychotic and Anxiolytic (typical drugs (phenothiazine , butyrophenones , thioxanthene) atypical drugs ( clozapine , olanzapine , sulpride</li> <li>- Anti Parkinson , the action , uses , and side effect of (anticholinergic anti-parkinson agents (benzatropine , benhexoln ,orphenandrine) ,dopamine agonists (bromocriptine , pergolide , cabergoline ) , and miscellaneous agents as ( amantadine , selegiline , levodopa ) )</li> <li>- Anti Epilepsy ( types of epilepsy ,drugs used in treating epilepsy( phenytoin , carbamazepine ,valproic acid , ethosuximide , phenobarbital , primidone , benzodiazepines , new epileptic drugs as ( felbamate , gabapentin , lamotrigine ))</li> <li>- CNS – stimulant</li> <li>- Hallucinogens</li> <li>- Alcohols ( ethanol , methanol , disulfiram reaction )</li> </ul>
<p>2.</p>	<p><b>Histamine and Antihistamine</b></p>	<ul style="list-style-type: none"> <li>▪ Histamine receptors ,distribution, biosynthesis, degradation.</li> <li>▪ Anti histamins ( general uses , side effects , <ul style="list-style-type: none"> <li>** H1 blockers first and second generations (diphenhydramine, hydroxyzine , promethazine, terfenadrine, phenothiazine chlorpheniramine, cyclazine, astimazole, loratadine desloratidine ,fexofenadine citrizine , levocitrizine.)</li> <li>** H2 blockers ( cimitidine, rantidine, nizatidine,famotidine)</li> <li>** Drug inhibits histamine release, mast cell stabilizers ( cromylon sodium , ketotifen )</li> </ul> </li> </ul>
<p>3.</p>	<p><b>Drugs affect the Gastro intestinal tract</b></p>	<ul style="list-style-type: none"> <li>▪ Drugs used in Ulcer <ul style="list-style-type: none"> <li>** anti-acid ( sodium bicarbonate , aluminum hydroxide ,magnesium hydroxide ,calcium salts ) , mucosal protective agents ( sucralfate, bismuth )H2 blockers(ranitidine, famotidine, cimetidine , nizatidine), antimicrobial agents (treating of H-pylori peptic ulcer ) , prostaglandins (misoprostol ) , proton pump inhibitors(omeprazole , lansoprazole, esomeprazole , pantoprazole), antimuscarinic drugs(pirenipine )</li> </ul> </li> </ul>



		<ul style="list-style-type: none"> <li>▪ Gastroesophageal reflux disease and role of anti-acid</li> <li>▪ Anti-flatulent (antifoam , kaolin , activated charcoal )</li> <li>▪ Antispasmodic agents( anticholinergic drugs (dicyclomine , hyoscyamine ) ,mebeverine , peppermint oil ).</li> <li>▪ anti-vomiting-antiemetic ( 5-HT3 receptor antagonists (ondansetron) , dopamine antagonists (domperidone , olanzapine , haloperidol) antihistamines ( cyclizine , diphenhydramine ,dimenhydramine , meclizine, promethazine ) , cannabinoids , benzodiazepines , anticholenergics and other miscellaneous )</li> <li>▪ Laxatives and purgative ( bulk-foaming agents ,hyperosmotic laxative , stimulant and irritant , stool softnersor lubricants )</li> <li>▪ anti diarrhea (antimotility agent (loperamide ) ,anticholinergics , lactobacillus and acidobacillus ,adsorbents , narcotics (codeine , diphenoxylate )</li> </ul>
4.	<b>Drugs affect the Respiratory system</b>	<ul style="list-style-type: none"> <li>▪ Asthma management ( bronchodilators( beta2 agonists ,anticholenergics , adrenergic agonists , methyl-xanthines ( aminophylline ,theophylline ) , anti-inflammatory ( corticosteroids , leukotriene antagonists , mast cell stabilizers )</li> <li>▪ Chronic obstructive pulmonary disease management</li> <li>▪ Anti tussive ( morphine-codeine , pholcodeine , dextromethorphane )Expectorant ( ammonium chloride , ipecacuana , guaphensin ) -mucolytic agents ( ambroxol , bromohexine ) demulcents ( benzoin tincture ) . ( differentiate between productive and dry cough remedies )</li> </ul>
5.	<b>Drugs affect the Nutrition</b>	<ul style="list-style-type: none"> <li>▪ Anemia drugs ( Iron, folic acid, B12)</li> <li>▪ Minerals (zinc, copper, Chromium, manganese, selenium)</li> <li>▪ Vitamins ( A, K, E, D, C, B1, B2, B3, B6, B9)</li> </ul>



6.	<b>Drugs affect the skin</b>	<ul style="list-style-type: none"> <li>▪ Dermatological formulations ( demulcents , emollients , astringents , counter irritant , rubefacients ,protective and absorbents , caustics and keratolytic agents )</li> <li>▪ Eczema</li> <li>▪ Psoriasis</li> <li>▪ Anti pigmentation drugs (bleaching agents</li> <li>▪ Acne Vulgaris                         <ul style="list-style-type: none"> <li>– Etiology and Pathophysiology of Acne, Classification of Acne, Diagnosis of Acne, OTC and prescription treatment of Acne</li> </ul> </li> </ul>
7.	<b>Drugs Used in Gout</b>	<ul style="list-style-type: none"> <li>▪ What is gout , treatment of gout ( acute attack and repeated attacks , prophylactic drugs ) the action , the uses and the side effects of</li> <li>▪ Allopurinol</li> <li>▪ Colchicine</li> <li>▪ Uricosuric ( Probenecid)</li> </ul>



## Evaluation Strategies:

Exams		Percentage	Date
Exams	midterm Exam	30%	--/--/----
	Final Exam	50%	--/--/----
Case study Homework and Projects		20%	--/--/----

## Teaching language:

- English

## Teaching Methodology:

- Lectures, Discussions, quizzes and exams, Home works and home assignments.
- Case studies, presentations, group discussion, and Field visits to hospitals and case reports ( Psychatric hospitals, addiction treatment centre )

## References:

1. Lang, Basic & Clinical Pharmacology, Bertram G. Katzung, Anthony J. Trevor. 13e.2017
2. Lippincott's Illustrated Reviews: Pharmacology, Richard A. Harvey, Richard D. Howland, Mary J. Mycek, Pamela C. Champe , Publisher: Lippincott Williams & Wilkins, 5th edition 2012
3. Goodman & Gilman's The Pharmacological Basis of Therapeutics, Laurence L. Brunton, John S. Lazo, Keith L. Parker, Publisher: McGraw-Hill, 12th edition 2011
4. Jordan National Drug Formula , version 2 / 2011 / www.jfda.jo.rdu