Baghdad College of medical sciences / department of Pharmacy
Syllabus

Fifth stage		
1st semester	**Lecture title**	**hours**
Title of the course: ***Organic Pharmaceutical Chemistry*** **IV** Course number: **511** Level: 5th Class, 1st Semester Credit hours/week : **Theory 2** Reference text: ***Wilson and Gisvold Textbook of Organic Medicinal and Pharmaceutical Chemistry; Delgado JN, Remers WA, (Eds.); 10th ed., 2004.*** **Objectives**: To give the students knowledge and experience in pro-drug and hormones as part of their medicinal and pharmaceutical field. It includes classification, synthesis, biotransformation and/or formulation of certain drugs to improve their action as well as to avoid some side effect.		
Organic Pharmaceutical Chemistry IV	Basic concept of prodrugs; Covalent bonds (cleavable); Prodrugs of functional groups; Types of prodrugs.	6
	Chemical delivery systems; Polymeric prodrugs; Types and structure of polymers; Cross-linking reagents.	6
	Drug targeting.	4
	Project.	4
	Combinatorial chemistry; Peptides and other linear structures; Drug like molecules; Support and linker; Solution-phase combinatorial chemistry.	5
	Detection, purification and analgesics; Encoding combinatorial libraries; High-throughput screening; Virtual screening; Chemical diversity and library design.	5

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Title of the course: ***Industrial Pharmacy* II** Course number: **512**

Level: 5th Class, 1st Semester

Credit hours/week: **Theory 3 Laboratory 1**

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

Objectives: The coarse 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.

Industrial Pharmacy II	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.	10
	Tablet coating; principles; properties; equipments; processing; types Of coating (sugar and film); quality control, and problems.	4
	Capsules: Hard gelatin capsules; materials; production; filling equipments; formulation; special techniques.	3
	Soft gelatin capsules: Manufacturing methods; nature of capsule shell and content; processing and control; stability.	2
	Micro-encapsulation; core and coating materials; stability; equipments and methodology.	2
	Modified (sustained release) dosage forms; theory and concepts; evaluation and testing; formulation.	3
	Liquids: Formulation; stability and equipments.	3
	Suspensions: Theory; formulation and evaluation.	3
	Emulsions: Theory and application; types; formulation; equipments And quality control.	3

	Semisolids: Percutaneouse absorption; formulation; types of bases (vehicles) preservation; processing and evaluation.	3
	Suppositories: Rectal absorption; uses of suppositories; types of bases; manufacturing processes; problems and evaluation.	3
	Pharmaceutical aerosols: Propellants; containers; formulation; types And selection of components; stability; manufacturing; quality control and testing.	6

Title of the course: Therapeutic Drug Monitoring (TDM)
Course number: 529
Level: 5th Class: 2nd Semester
Credit hours/week: Theory 2 , Laboratory 1
Reference Texts:
Applied Clinical Pharmacokinetics, Second Edition, 2008 by Larry A. Bauer.
Additional references include but not limited to the following:
Clinical Pharmacokinetics Concepts and Applications, Third Edition, 1995 by Malcolm Rowland and Thomas Tozer;

Therapeutic I	Interpretation of Lab. data.	2
	Acute coronary syndrome.	2
	Arrhythmias	2
	Thrombosis	2
	Dyslipidemia	1
	Stroke	2
	Shock	2
	Liver cirrhosis	2
	Viral hepatitis	1
	Inflammatory bowel diseases	2
	Acute renal failure (ARF)	1
	Chronic renal failure (CRF)	2
	Hemodialysis and peritoneal dialysis	1
	Systemic lupus erythematosis (SLE)	1
	Benign prostatic hyperplasia (BPH)	1
	Acid – base disorders	2
	Disorders of fluid and electrolytes	2
	Urinary incontinence and pediatric enuresis	1

	Epilepsy and status epilepticus	2
	multiple sclerosis	1
	Parkinson's disease	2
	Pain management	2
	Headache disorders	1
	glucoma	2
	Parenteral nutrition	2
	Enteral nutrition	2
	Pharmacovigilance	2
Title of the course: ***Clinical Chemistry*** Course number: **514** Level: 5th Class, 1st Semester Credit hours/week : **Theory 3 Laboratory 1** Reference text: ***1- Clinical Chemistry & Metabolic Medicine, Crook, 2006. 2- Clinical Chemistry, Kaplan, 2003.*** **Objectives**: To exhibit knowledge of human body chemistry levels under healthy and abnormal conditions. At the end of the semester the students should be familiar with the basic and advanced information in clinical laboratory chemistry and how it relates to patient health and care		
Clinical Chemistry	Disorders of Carbohydrates metabolism, Hyperglycemia & Diabetes mellitus, Hypoglycemia.	3
	Disorders of lipid metabolism.	2
	Liver Function Tests.	4
	Kidney Function Tests.	4
	Diagnostic enzymology.	4
	Hypothalamus & pituitary endocrinology, disorders of anterior pituitary hormones, disorders of adrenal gland, hypopituitrism.	8
	Reproductive system, disorders of gonadal function in males & females, biochemical assessment during pregnancy.	5
	Tumor markers.	4

	Drug interaction with laboratory Tests.	2
	Disorders of calcium metabolism	3
	Acid- Base Disorders.	4
Title of the course: ***Clinical Toxicology*** Course number: **516** Level: 5th Class, 1st Semester Credit hours/week : **Theory 2 Laboratory 1** Reference text: ***1- Gossel TA, Bricker TD, (Eds.); Principles of Clinical Toxicology; latest edition. 2-Viccellio P, (Ed.); Handbook of Medicinal Toxicology; latest edition.*** **Objectives**: The course aims to provide students with the principles and skills required to deal with the toxicity of chemicals and drugs in clinical settings; it enables students to correlate signs and symptoms of toxicity with the analytical data, and to know how to establish preventive and therapeutic measures for poisoning cases.		
Clinical Toxicology	Initial Evaluation and Management of the Poisoned Patient. Including pediatric poisoning and special consideration in the geriatric patient	3
	Drug Toxicity: Over the counter drugs; caffeine; theophylline; antihistamine and decongestant; non-steroidal anti-inflammatory drugs; vitamins.	3
	Prescription Medications: Cardiovascular drugs; beta blockers; ACE inhibitors; Digoxin; Calcium channel blocker; Antiarrhythmic agents; hypoglycemic drugs; Opiods; CNS depressants; tricyclic antidepressants; anti-cholinergic phenothiazines; CNS stimulant.	13
	Drug of Abuse: Opioids; Cocaine; phencyclidine; marijuana; Lysergic acid.	4
	Chemical and Environmental Toxins: Hydrocarbones; Household toxins; Antiseptic; Disinfectants; Camphor; moth repellents.	3
	Botanicals and plants-derived toxins: Herbal preparation; Toxic plants; Poisonous mushrooms.	4

College of Pharmacy **Department of Clinical Laboratory Sciences** **Title of the course: Clinical Laboratory Training Course number: 515** Level: 5th Class, 1st Semester Credit hours/week: 2 Objectives: It provides general information about the biochemical basis of disease and about the principles of laboratory diagnosis; it supplies specific guidance on the **clinical value of chemical investigations, indicating their range of application and** **limitations as well as relating results of laboratory tests to the process of clinical** **diagnosis and management as these might applied to individual patients.**		
Clinical Laboratory Training	Diagnostic test basics, collecting &transporting specimens, venipuncture, urine specimen, stool specimen.	4
	Biochemical tests: Fasting blood glucose, Post-prandial glucose, Oral glucose tolerance test.	4
	Blood urea, Blood creatinine, Creatinine clearance, Uric acid.	4
	Cholesterol, Lipoproteins, triglycerides.	4
	Blood proteins, Bilirubin.	4
	Calcium, Inorganic phosphate, Serum chloride	4
	Alkaline phosphatase, Acid phosphatase, Alanine amiotransferase, Aspartate aminotransferase, Lactate dehydrogenase, Creatine phosphokinase.	4
	Serological tests: VDRL, ASO- Titer, Hepatitis tests.	4
	C-reactive protein test, Rheumatic factor test, Rosebengal test, Typhoid fever test(Widal test), Pregnancy Test.	4
	General urine examination, urine specimen collection.	4
	Hematological tests: RBC count, Hb, PCV, RBC indices, WBC count, Platelets count.	4

	Blood typing, Coombs test, Bleeding time, ESR.	4
	Microbiological tests: culture and sensitivity tests, Staining methods	4
	Culture media, Enriched culture media for general use	4
	Tests for identification of bacteria, Disk diffusion tests of sensitivity to antibiotics, Choice of drugs for disk test, bacterial disease and their laboratory diagnosis.	4

Semester 2	**Lecture title**	**hours**
Title of the course: ***Pharmacoeconomy*** Course number: **527** Level: 5th Class, 2nd Semester Credit hours/week: **Theory 2** Reference text: ***Bootman JL, Townsend RJ, McGhan WF, (Eds.), Principles of Pharmacoeconomics, 2nd ed., Harvey Whitney Books Company, Cincinnati, Oh, latest edition*** **Objectives**: The present course will give students the basic understanding of the tools needed to asses the costs and outcomes of medications and pharmaceutical care services. It will enable participants to evaluate the pharmacoeconomic and quality of life literature for the purpose of rational decision-making. Students will be exposed to the drug-focused approaches to pharmacoeconomic research and the fundamentals of quality of life research.		
Pharmacoeconomy	Course overview & basic principle of pharmacoeconomics	2
	Cost analysis	6
	Cost effectiveness analyses (CEA).	2
	1st mid-term examination.	2
	Cost utility analyses (CUA).	2
	Cost-benefit analysis (CBA)	2
	Critical assessment of economic evaluation	4
	2nd mid-term examination.	2
	Drug-focused versus disease-focused frame work for Conducting pharmacoeconomic analyses.	2
	Introduction to epidemiology.	2
	Project presentation.	2
	Project presentation.	2

Title of the course: Therapeutic Drug Monitoring (TDM) Course number: 529 **Level: 5th Class: 2nd Semester** **Credit hours/week: Theory 2 , Laboratory 1** **Reference Texts:** **Applied Clinical Pharmacokinetics**, Second Edition, 2008 by Larry A. Bauer. Additional references include but not limited to the following: **Clinical Pharmacokinetics Concepts and Applications**, Third Edition, 1995 by Malcolm Rowland and Thomas Tozer;		
Therapeutic Drug Monitoring	Review of basic pharmacokinetic (PK) and pharmacodynamic (PD)	2
	Clinical PK equations and calculations	3
	Clinical PK in special population and cases	3
	Clinical PK/PD for Aminoglycosides	2
	Clinical PK/PD for Vancomycin	2
	Clinical PK/PD for Digoxin	2
	Clinical PK/PD for Phenytoin	3
	Clinical PK/PD for other Anticonvulsants (e.g., Carbamazepine, Valproic Acid, Phenobarbitone/Primidone, Ethosuxsimide	3
	Clinical PK/PD for Theophylline	2
	Clinical PK/PD for Immunossprasants (e.g., Cyclosporine, Tacrolimus	2
	Clinical PK/PD for other Cardiovascular agents (e.g., Lidocaine, Procainamide/N-Acetyl Procainamide	2
	Clinical PK/PD of other drugs (e.g., Lithium), Anticancer agents, and Anticoagulats	4
Title of the course**: Applied Therapeutic II** Level: 5th Class, 2nd Semester Credit hours/week : Theory 2 Reference Text: Roger Walker, Clive Edwards (eds), Clinical Pharmacy & Therapeutics. Barbara G.Wells & Joseph T. Diriro, Pharmacotherapy hand book 7th Edittion		
	Thyroid and parathyroid disorders	2
	Contraception	1
	Endometriosis	1
	Menstruation related disorders	1

Therapeutic II	Hormonal replacement therapy (HRT)	2
	Cancer treatment and chemotherapy	2
	Leukemias	2
	Lymphomas and Multiple myeloma	2
	Breast and prostate cancers	2
	Adverse effects of chemotherapy	1
	Human immunodeficiency viruse	2
	Adrenal gland disorders	1
	Pituitary gland disorders	1
	Alzheimer's disease	1
	Schizophrenia	2
	Depressive disorders	2
	Anxiety disorders	1
	Sleep disorders	1
	Bipolar disorders	2
	colorectal cancer	1
Department of pharmaceutics **Title of the course : pharmaceutical biotechnology** **Level 5th. Year , 2nd semester** **credit (1 hours) ,Course number 5213** **Reference : *pharmaceutical biotechnology*** ***J . A . Crommelin , Robert D. Syinder***		
pharmaceutical biotechnology	Biotechnology - introduction	1
	Formulation of biotechnology product (biopharmaceutical consideration) Microbial consideration- sterility-pyrogen viral decontamination Excipients of parentral products - solubility enhancer-anti adsorption agents buffer components-preservatives – osmotic agents	4
	Route of administration Parentral route Oral route Alternative	5
	Pharmacokinetic of peptides and proteins Introduction,Elimination of proteins (proteolysis-excretion-metabolism)	5

Title of the course: ***Dosage form Design*** **Course** number: **5212**

Level: 5th Class, 2nd Semester
Credit hours/week : **Theory 2**
Reference text: ***Pharmaceutical Dosage Forms and Drug Delivery Systems by Haward A. Ansel.***
Objectives: This course enables students to understand the principles and factors that influence design dosage forms; and the applications of these principles in the practice of pharmaceutical industry.

Dosage form Design	Pharmaceutical consideration: The need for the dosage form.	1
	General consideration for the dosage form.	3
	Pre-formulation; physical description, microscopic examination.	2
	Melting point; phase rule; particle size; polymorphism;	2
	Permeability; pH; partition coefficient; pka; stability; kinetics; shelf	2
	Rate reaction; enhancing stability.	2
	Formulation consideration: Excipients; definition and types; appearance; palatability; flavoring.	2
	Sweetening; coloring pharmaceuticals; preservatives; sterilization;	2
	Biopharmaceutical considerations: Principle of drug absorption**;** dissolution of the drugs**.**	4
	Bioavailability and bioequivalancy; FDA requirements.	3
	Assessment of bioavailability; bioequivalence among drug	3
	Pharmacokinetic principles: Half life; clearance; dosage regimen considerations.	4

Title of the course: ***Advanced Pharmaceutical Analyses*** **Course** number: **5210**

Level: 5th Class, 2nd Semester
Credit hours/week : **Theory 3 Laboratory 1**
Reference text: ***1. Spectrometric Identification of Organic Compounds by Silverstein, Bassler and Morrill; Applications of absorption spectroscopy of organic compounds by Dyer JR. 3. Organic Chemistry by McM 5thed; Thomason learning CA, USA 2000.***

Objectives: To study spectrometric methods used for identification and characterization of organic compoun including UV, IR, MASS and NMR spectroscopy; it enables students to understand the applications of these techniques for qualitative and quantitative analysis of organic compounds.

Advanced pharmaceutical Analyses	UV / visible spectroscopy; Sample handling and instrumentation; Characteristic absorption of organic compounds; Rules for calculation of lambda max and application; Application of UV/visible; spectroscopy; Problems and solutions.	6
	Infra Red spectroscopy (theory and H-bonding effect; Sampling techniques and interpretation of spectra; Characteristic group frequencies of organic compounds; Application of IR spectroscopy; Problems and solutions.	14
	H^1 –Nucleomagnetic Resonance (NMR) and C^{13}-NMR spectroscopy; Introduction, the nature of NMR absorption, chemical shifts and factors affecting them, information obtained from NMR spectra, more complex spin-spin splitting patterns, application of H_1-NMR spectroscopy; C_{13}-NMR spectroscopy: introduction and characteristics, DEPT C^{13}- NMR spectroscopy.	12
	Mass spectroscopy: Introduction and interpreting Mass spectra; interpreting Mass spectra fragmentation patterns, Mass behavior of some common functional groups.	11
	elemental microanalysis CHNSO	2