



وصف المقرر الدراسي

قسم الصيدلة

المرحلة الثالثة

Title of the course: **Biochemistry-I**

Level: 3rd Class, 1st Semester

Theory

No.	Lecture title
١.	Introduction to the macromolecules biochemistry: Definitions and terms; proteins, enzymes, DNA; Clinical value
٢.	Amino acids: Structures of A.A (table of standard A.A abbreviation and side chain); Classification, properties, isomerism
٣.	Amino acids: Chemical reactions, Zwitter ions, titration curve calculating isoelectric point values. Examples and questions. Non standards A.A: Structures, existence and clinical value
٤.	Peptides: Peptide bond, resonance forms, isomers, physical properties and chemical reactions. Essential poly peptides in human body, structures, roles and clinical values
٥.	Proteins: Structure and conformations of proteins, Primary structure, Secondary structure (α helix, β sheet), tertiary structure, quaternary structure. Classification, synthesis, cellular functions (Enzymes, cell signaling, and ligand transport, structural proteins), protein in nutrition
٦.	Denaturation of proteins and protein sequencing: Determining A.A composition, N- terminal A.A analysis, C- terminal A.A analysis, Edman degradation, prediction protein sequence from DNA/ RNA sequences. Methods of protein study: Protein purification, cellular localization, proteomics and bioinformatics, structure prediction and simulation
٧.	Carbohydrates: Chemistry and classification, biomedical importance, classification of CHO, Stereochemistry of monosaccharides, metabolism of CHO; Physiologically important monosaccharides, glycosides, disaccharides, polysaccharides
٨.	Lipids: Introduction, classification of lipids, fatty acids (F.A), nomenclature

	of F.A, saturated F.A, unsaturated F.A, physical and physiological properties of F.A, metabolism of lipids. Phospholipids, lipid peroxidation and antioxidants, separation and identification of lipids, amphipathic lipids
٩.	Enzymes: Structures and mechanism, nomenclature, classification, mechanisms of catalysis, thermodynamics, specificity, lock and key model, induced fit model, transition state stabilization, dynamics and function, allosteric modulation. Biological function, cofactors, coenzymes, involvement in disease
١٠.	Kinetics: General principles, factors effecting enzyme rates (substrate conc., pH, temperature, etc), single-substrate reaction (Michaelis-Menten kinetics), kinetic constants. Examples of kinetic questions and solutions.

١١.	Enzyme inhibition: Reversible inhibitors, competitive and non competitive inhibition, mixed-type inhibition, Irreversible inhibition. Inhibition kinetics and binding affinities (k_i), questions and solutions
١٢.	Control of activity and uses of inactivators; multi-substrate reactions, ternary-complex mechanisms, ping-pong mechanisms, non-Michaelis-Menten kinetics, pre-steady-state kinetics, chemical mechanisms
١٣.	Nucleic Acid: Chemical structure, nucleic acid components, nucleic acid bases, nucleotides and deoxynucleotides (Properties, base pairing, sense and antisense, super-coiling, alternative structures, quadruple structures
١٤.	Biological functions of DNA: Genes and genomes, transcription and translation, replication
١٥.	Biochemistry of extracellular and intracellular communication: Plasmamembrane structure and function; Biomedical importance, membrane proteins associated with lipid bilayer, membranes protein composition, dynamic structures of membranes, a symmetric structures of membranes
١٦.	Artificial membranes model, the fluid mosaic model, membrane selectivity, physiological functions of plasma membranes
١٧.	Biochemistry of the endocrine system: Classification of hormones, biomedical importance, the target cell concept and hormone receptors, biochemistry of hormone signal transduction
١٨.	Special topics: Nutrition, digestion, and absorption. Biomedical importance, digestion and absorption of carbohydrates, lipids, proteins, vitamins and minerals; energy balance. Biochemistry of hemostasis and clot formation

Title of the course: ***Practical Biochemistry-I***
Level: 3rd Class, 1st Semester

No.	Lab. Title
١.	Effects of acids on carbohydrates: Molish test; Bials test; Anthron test; Seliwanoffs test; Mucic acid test
٢.	Classification of carbohydrates according to reducing properties: Benedicts test; Fehlings test; Barfoed test
٣.	Classification of carbohydrates according to reducing properties: Iodine test; Ozasone test
٤.	Determiration of unknown carbohydrates sample
٥.	Color reactions of proteins: Biuret test; Ninhydrin test
٦.	Color reactions of proteins: Millons test; Hopkins-Cole test; unoxidized sulfur test
٧.	Solubility of proteins (effects of acid, neutral salts, heavy metals, and alkaloidal reagents)
٨.	Determiration of unknown sample of proteins
٩.	Experiments on solubility of lipids
١٠.	Acrolin test for lipids; Soap; Studying properties of soap
١١.	Determiration of saponification number
١٢.	Properties of lipids: Iodine test for lipids
١٣.	Properties of enzymes: Effects of heat on enzymes
١٤.	Properties of enzymes: Effect of concentration of enzyme (salivary amylase) on reaction velocity
١٥.	Properties of enzymes: Effect of pH on enzymatic activity

Title of the course: ***Inorganic Pharmaceutical Chemistry***
Level: 3rd Class, 1st Semester

Theory

No.	Lecture title
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١.	Atomic and molecular structure/ Complexation
٢.	Essential and trace ions: Iron, copper, sulfur, iodine
٣.	Non essential ions: Fluoride, bromide, lithium, gold, silver and mercury
٤.	Gastrointestinal agents: Acidifying agents
٥.	Antacids
٦.	Protective adsorbents
٧.	Topical agents
٨.	Dental agents
٩.	Radiopharmaceutical preparations
١٠.	Radio opaque and contrast media

Title of the course:

Practical of Inorganic Pharmaceutical Chemistry

Level: ٣rd Class, ١st Semester

No.	Lab title
١.	Preparation and standardization of ١N HCl (known sample)
٢.	Preparation and standardization of ١N HCl (quiz and unknown)
٣.	Preparation and standardization of ١N ١ NaOH (known sample)
٤.	Preparation and standardization of ١N NaOH (quiz and unknown)
٥.	Assay of NaOH solution (known sample)
٦.	Assay of NaOH solution (unknown sample)
٧.	Assay of sodium benzoate (known sample)
٨.	Assay of sodium benzoate (quiz and unknown)
٩.	Assay of Borax (explanation of basic concepts)
١٠.	Assay of Borax (quiz and unknown)
١١.	Assay of citric acid (known sample)
١٢.	Assay of citric acid (unknown sample)

१३.	Assay of magnesium hydroxide (known sample)
१४.	Assay of magnesium hydroxide (quiz and unknown)
१०.	Assay of ammoniated mercury (unknown sample)

Title of the course: ***Pathophysiology***

Level: 3rd Class, 1st Semester

Theory

No.	Lecture title
१.	Introduction.
२.	Cell injury and tissue response; Degeneration; Necrosis; Atrophy; Hypertrophy; Metaplasia and Calcification; Inflammation and Repair
३.	Disorders of electrolytes and water and acid–base balances: Hyper and Hyponatremia; Hyper and Hypokalemia; Syndrome of inappropriate secretion of ADH; Diabetes insipidus; Metabolic acidosis and alkalosis; Respiratory acidosis and alkalosis
४.	Disorders of cardiovascular system: Hyperemia; Congestion and edema; Thrombosis; embolism and infarction; Shock; Coronary heart disease and MI; Rheumatic heart disease; Heart failure; Acute pulmonary edema; Essential hypertension; Secondary hypertension; Malignant hypertension; Hypotension; Aneurysm versus varicose veins
०.	Disorders of respiratory system: Pneumonias; Tuberculosis; Respiratory distress syndrome; Bronchial asthma; Emphysema and bronchiectasis; Cystic fibrosis; Pulmonary embolism; Pulmonary hypertension
६.	Disorders of the renal system: Nephrotic syndrome; Glomerulonephritis; Diabetic glomerulosclerosis; Hypertensive glomerular disease; Pyelonephritis; Drug related nephropathies; Acute renal failure; Chronic renal failure
७.	Disorders of GI and hepatobiliary systems: Peptic ulcer and Zollinger – Ellison syndrome; Irritable bowel syndrome; Crohn's disease; Diarrhea; Celiac disease; Viral hepatitis; Primary biliary cirrhosis; Liver failure; Cholelithiasis
४.	Disorders of thyroid function: Hypothyroidism, Hyperthyroidism, Graves's disease, Thyrotoxicosis
९.	Disorders of adrenal function: Cushing syndrome. Adrenal cortical insufficiency (primary and secondary). Congenital adrenal hyperplasia. Pheochromocytoma
१०.	Diabetes mellitus and metabolic syndrome; Dyslipoproteinemia
११.	Neoplasia.
१२.	Metabolic and rheumatic disorders of skeletal system: Osteoporosis; Osteomalacia and rickets; Rheumatoid arthritis; Systemic lupus erythematosus; Ankylosing

	spodylitis; Gout; Osteoarthritis syndrome.
١٢	Alteration in immune response: Hypersensitivity disorders; Autoimmune disease; Transplantation immunopathology; Immunodeficiency disorders

Title of the course: ***Practical Pathophysiology***

Level: ٣rd Class, ١st Semester

No.	Lab. Title
١.	General introduction and slide preparation
٢.	Cell injury and degenerations
٣.	Growth disturbances
٤.	Inflammation
٥.	Thrombosis
٦.	Neoplasia
٧.	Disorders of respiratory system
٨.	Disorders of the cardiovascular system
٩.	Disorders of renal system
١٠.	Liver disorders.
١١.	Disorders of the gastrointestinal tract
١٢	Disorders of the central nervous system
١٣	Disorders of the reproductive system
١٤.	Disorders of skeletomuscular system
١٥.	Disorders of endocrine system

Title of the course: ***Pharmaceutical Technology-I***

Level: ٣rd Class, ١st Semester

Theory

No.	Lecture title
١.	Dispersed systems: their classification; comparisons between different systems
٢.	Solutions and types of solutions
٣.	Solubility: Factors affecting solubility; expression of dissolution; dissolution rate versus solubility; preparation of solutions containing non-volatile materials
٤.	Official solutions; classification of official solutions; preparation and uses
٥.	Aqueous solutions containing aromatic principles; aromatic waters; methods of preparations; stability
٦.	Syrups: sugar based syrups; artificial and sorbitol based syrups; stability of syrups
٧.	Definition and methods of clarification; filter aids in clarification
٨.	Preparation of solutions using mixed solvent systems; spirits, and elixirs
٩.	Extraction; maceration and percolation
١٠.	Tinctures; fluid extracts; extracts of resins and oleoresins.
١١.	Colloidal dispersions; lyophilic; lyophobic
١٢.	Coarse dispersion; suspensions



Title of the course:
Practical of Pharmaceutical Technology-I
 Level: 3rd Class, 1st Semester

No.	Lab. Title
1.	Solutions (Into body cavity, oral and external use)
2.	Syrups: Preparation techniques and quality evaluation
3.	Elixirs: Preparation techniques and quality evaluation
4.	Spirits: Preparation techniques and quality evaluation
5.	Suspensions: Preparation techniques and quality evaluation
6.	Dispersion of oils in inhalations

Title of the course:***Pharmacognosy-II***
 Level: 3rd Class, 1st Semester

Theory

No.	Lecture title
1.	Introduction: General biosynthesis pathways of secondary metabolites
2.	Carbohydrates
3.	Glycosides: Biosynthesis, physical and chemical properties; cardiac glycosides; saponin glycosides; anthraquinone glycosides; flavonoid glycosides; cyanophore lycosides
4.	Glycosides: Isothiocyanate glycosides; aldehyde glycosides; alcoholic glycosides; phenolic glycosides; lactone glycosides; coumarins and chromones
5.	Resins and resin combination; tannins
6.	Lipids: fixed oils and waxes

٧.	Volatile oils: Introduction; chemistry of volatile oils; biosynthesis of volatile oils; hydrocarbons as volatile oils; alcohols as volatile oils; aldehydes as volatile oils
٨.	Ketones as volatile oils; Phenols as volatile oils; Oxides as volatile oils; Ester as volatile oils; Phenolic ethers as volatile oils
٩.	Non- medicinal toxic plants
١٠.	Vitamins and Amino acids

Title of the course: ***Practical Pharmacognosy-II***

Level: ٣rd Class, ١st Semester

No.	Lab. Title
١.	Cardio-active glycosides
٢.	Anthraquinone glycosides
٣.	Saponin glycosides
٤.	Tannins
٥.	Volatile oils
٦.	Isolation of piperine from black pepper
٧.	Isolation of belladonna alkaloids and their identification
٨.	Isolation of caffeine from tea
٩.	Isolation of <i>Peganum harmala</i> alkaloids
١٠.	Preparation of Khellin
١١.	Flavonoids of <i>Ruta graveolens</i>
١٢.	Extraction of hesperidin
١٣.	Isolation of pectin
١٤.	Isolation of citric acid from lemon juice
١٥.	Isolation of Podophyllotoxin from <i>Podophyllum emodi</i>; Isolation of Rotenone from <i>Lonchocarpus</i> Spp

Title of the course: ***Biochemistry-II***

Level: ٣rd Class, ٢nd Semester

Theory

No.	Lecture title
١.	Bioenergetic
٢.	Biologic oxidation
٣.	The respiratory chain and oxidative phosphorylation.
٤.	Over view of metabolism
٥.	Citric acid Cycle
٦.	Glycolysis
٧.	Metabolism of glycogen
٨.	Gluconeogenesis
٩.	Pentose phosphate pathway and other pathways of hexose metabolism
١٠.	Biosynthesis of fatty acids
١١.	Oxidation of fatty acids
١٢.	Metabolism of acylglycerol and sphingolipids
١٣	Lipid transport and storage
١٤	Cholesterol synthesis, transport, and excretion
١٥.	Biosynthesis of the Nutritionally Nonessential Amino Acids
١٦.	Catabolism of Proteins & of Amino Acid Nitrogen
١٧.	Catabolism of the Carbon Skeletons of Amino Acids
١٨.	Conversion of Amino Acids to Specialized Products
١٩.	Porphyrins & Bile Pigments

Title of the course: *Practical Biochemistry-II*
 Level: ٣rd Class, ٢nd Semester

No.	Lab. Title
١.	General urine examination: Physical properties

٢.	General urine examination: Chemical properties; Protein in urine; Sugar in urine
٣.	General urine examination: Ketone bodies in urine (Rothera test); Bile salts in urine (Hays test); Bilirubin in urine
٤.	General urine examination: Evaluation of unknown urine sample
٥.	Cerebrospinal fluid analysis: Measurement of glucose in CSF
٦.	Cerebrospinal fluid analysis: Measurement of chloride in CSF
٧.	Cerebrospinal fluid analysis: Measurement of proteins in CSF
٨.	Serum calcium measurement
٩.	Blood phosphorus measurement (inorganic phosphate)
١٠.	Serum total proteins (quantitative analysis)
١١.	Estimation of urea level in the blood
١٢.	Measurement of serum uric acid level
١٣	Measurement of serum ascorbic acid level
١٤	Gastric juice analysis: Detection of free hydrochloric acid concentration
١٥.	Gastric juice analysis: detection of free acid, total acid content

Title of the course: ***Pharmacy Ethics***
 Level: ٣rd Class, ٢nd Semester

Theory

No.	Lecture title
١.	Introduction to Pharmacy Ethics (Theoretical considerations)
٢.	Code of Ethics for Pharmacists
٣.	Common Ethical Considerations in Pharmaceutical Care Practice (Beneficence, Autonomy, Honesty, Informed Consent, Confidentiality, Fidelity)

٤.	Inter-professional Relations
٥.	Making ethical decisions
٦.	Ethical issues related to clinical pharmacy research
٧.	Ethical problems in the pharmacist's clinical practice
٨.	Preventing misuse of medicines
٩.	Case studies in pharmacy ethics

Title of the course: ***Organic Pharmaceutical Chemistry- I***

Level: ٣rd Class, ٧nd Semester

Theory

No.	Lecture title
١.	Drug distribution
٢.	Acid- base properties
٣.	Statistical prediction of pharmacological activity
٤.	QSAR models
٥.	Molecular modeling (Computer aided drug design)
٦.	Drug receptor interaction: force involved
٧.	Steric features of drugs
٨.	Optical isomerism and biological activity
٩.	Calculated conformation
١٠.	١٠. Three- dimensional quantitative structure activity relationships and databases
١١.	Isosterism
١٢.	Drug-receptor interaction and subsequent events
١٣	General pathways of drug metabolism: Sites of drug biotransformation; Role of cytochrome P٤٥٠ mono-oxygenases in oxidative biotransformation; Oxidative reactions; Reductive reactions; Hydrolytic reactions; Phase II reactions

Title of the course:
Practical of Organic Pharmaceutical Chemistry- I
 Level: ٣rd Class, ٢nd Semester

No.	Lab. Title
١.	Preparation and standardization of ٠.١ N KMnO_4 (known sample)
٢.	Preparation and standardization of ٠.١ N KMnO_4 (quiz and unknown)
٣.	Assay of hydrogen peroxide solution (known sample)
٤.	Assay of hydrogen peroxide solution (quiz and unknown sample)
٥.	Assay of ferrous sulfate (known sample)
٦.	Assay of ferrous sulfate (unknown sample)
٧.	Preparation and standardization of ٠.١ $\text{Na}_2\text{S}_2\text{O}_4$ solution (known sample)
٨.	Preparation and standardization of ٠.١ $\text{Na}_2\text{S}_2\text{O}_4$ solution (quiz and unknown sample)
٩.	Assay of copper sulfate (known sample)
١٠.	Assay of copper sulfate (unknown sample)
١١.	Assay of Chlorinated Lime (known sample)
١٢.	Assay of Chlorinated Lime (quiz and unknown)
١٣.	Preparation and assay of Lugol's Solution (known sample)
١٤.	Preparation and assay of Lugol's Solution (quiz and unknown)
١٥.	Assay of Alum (unknown sample)

Title of the course: ***Pharmaceutical Technology-II***
 Level: ٣rd Class, ٢nd Semester

Theory

No.	Lecture title
١.	Emulsions; purpose of emulsification; methods of emulsification; emulsifying agents; HLB system; stability of emulsions
٢.	Lotions; liniments and collodions
٣.	Suppositories
٤.	Powdered dosage forms
٥.	Semisolid dosage forms
٦.	Incompatibilities in pharmaceutical dosage forms

Title of the course:
Practical of Pharmaceutical Technology-II
 Level: ٣rd Class, ٢nd Semester

No.	Lab. Title
١.	Emulsions: Preparation techniques and quality evaluation
٢.	Suppositories: Preparation techniques and quality evaluation
٣.	Powders: Preparation techniques and quality evaluation
٤.	Capsules: Preparation techniques and quality evaluation
٥.	Semisolid dosage forms: Preparation techniques and quality evaluation

Title of the course:***Pharmacognosy-III***
 Level: ٣rd Class, ٢nd Semester

Theory

No.	Lecture title
١.	Alkaloids: Introduction; Physical and chemical properties; pyridine, piperidine alkaloids; tropane alkaloids
٢.	Alkaloids: Quinoline tropan alkaloids; iso-quinoline alkaloids; imidazole alkaloids; indole alkaloids
٣.	Alkaloids: Steroidal alkaloids; lupinane alkaloids; alkaloidal amines; purine alkaloids

٤.	Antibiotics: Natural sources; biosynthetic pathways, isolation and purification
٥.	Tissue culture of medicinal plant: Introduction and history; laboratory of the plant tissue culture; aseptic techniques
٦.	phytotherapy :Introduction , principles,medicinal plants in selected health care systems.Important natural products & phytomecines used in pharmacy & medicine.

Title of the course:**Practical Pharmacognosy–III**

Level: ٣rd Class, ٧nd Semester

No.	Lab. title
١.	Isolation of <i>Peganum harmala</i> alkaloids
٢.	Preparation of Khellin
٣.	Flavonoids of <i>Ruta graveolens</i>
٤.	Extraction of hesperidin
٥.	Isolation of pectin
٦.	Isolation of citric acid from lemon juice
٧.	Isolation of Podophyllotoxin from <i>Podophyllum emodi</i>; Isolation of Rotenone from <i>Lonchocarpus</i> Spp
٨.	Isolation of <i>Peganum harmala</i> alkaloids

Title of the course:**Pharmacology -I**

Level: ٣rd Class, ٧nd Semester

Theory

No.	Lecture title
١.	General introduction to Pharmacology
٢.	Pharmacokinetics
٣.	Drug Receptor interaction and Pharmacodynamics

٤.	The autonomic nervous system (ANS)
٥.	Cholinergic system
٦.	Adrenergic system
٧.	Principal of antimicrobial therapy
٨.	β- lactam and other cell wall synthesis inhibitor antibiotics
٩.	Protien synthesis inhibitors
١٠.	Quinolones, Folate antagonists, and urinary tract antiseptics
١١.	Antimycobacterium drugs
١٢.	Antifungal drugs
١٣	Antiprotozoal drugs
١٤	Anthelmintic drugs
١٥.	Antiviral drugs

