



Faculty of Pharmacy and Medical Sciences

Department of Pharmaceutical Science

93111 General Chemistry (1) {3} [3-3]

Introduction to chemical sciences; Matter: Classification, Properties of different types of matter; Elements and the periodic table: Nomenclature, Simple ionic and covalent compounds, Measurements, and significant figures; Stoichiometry: % composition, formulas, and chemical equations; Chemical reactions of aqueous solutions: acids, Bases and salts; Oxidation-reduction reactions; Electronic configuration of atoms: Properties of ionic and covalent bonds, and Lewis structure.

Prerequisite: -

93112 General Chemistry (2) {3} [3-3]

Introduction; Gases and their laws; States of matter and intermolecular forces; Physical and colligative properties of solutions; Chemical kinetics: Reaction mechanisms, and Thermochemistry; Chemical thermodynamics: Principles of chemical equilibrium (K_a , K_c), Equilibrium in solutions of acids and bases (K_w , K_a , K_b), pH of strong acids and strong bases, Weak acids and weak bases, Buffer solutions, and Salts; Equilibrium in precipitation reactions (K_{sp}).

Prerequisite: 93111 General Chemistry (1)

93113 General Chemistry Lab {1} [2-1]

Introduction to laboratory safety Rules; Physical Separation of mixtures: Distillation, extraction, and recrystallization; Empirical formula of compound; Determination of acid and base in vinegar; Indicators; buffers; measurement of pH; Identification of chemical substances; Solutions.

Prerequisite: -

93114 Biology (1) {3} [3-3]

Introduction to general biology; Water; Macromolecules; Cell; Membrane; Metabolism; Cellular Respiration; Cell Cycle; From Gene to Protein.

Prerequisite: -

93115 Biology (2) {3} [3-3]



The biological diversity; Diversity of the five kingdoms of living organisms: Organisms, Monerans, and Protists; The major phyla of the animal kingdom; The structure and function of systems and organs of the animals (using the human body as a model); Survey on plant: Structure, function diversity, and its ecological importance.

***Prerequisite:* 93114 Biology (1)**

93116 Biology Lab {1} [2-1]

Introduction to Biology Lab; Compound light microscope; Preparing slides: Plant tissue, and animal tissue; Physical and chemical properties of cell; Histology; Animal tissue; Basic microbiological techniques to identify gram positive and gram negative bacteria; Plants and its life cycle: Algae, fungi, and bryophytes; Introduction to protozoan: vertebrate, and dissect example of vertebrates

***Prerequisite:* -**

93120 Organic Chemistry {3} [3-3]

Introduction to organic chemistry; Bonding: Polarity, Structural formulas, Isomerism, and Hybridization; Classification of organic compounds; Aliphatic compounds: Nomenclature and reactions, Alkanes, alkenes, alkynes, and cycloalkanes; Aromatic compounds; Alcohols; Ethers; Aldehydes; Ketones; Carboxylic acids; Esters; Acyl halides; Amides; Amines.

***Prerequisite:* 93111 General Chemistry (1)**

36112 Calculus {3} [3-3]

Introduction to Calculus; The rate of change of a function; Limits; Derivatives of algebraic functions and their applications; Integration; Application of the definite integral.

***Prerequisite:* -**

36129 General Physics {3} [3-3]

Introduction to Physics; Measurement and standards; Physical quantities; Vectors; Addition and multiplication of vectors; Motion in straight line: displacement, velocity, acceleration, finding the motion of an object, free fall, and vertical jumping; Motion in two dimensions; Projectile in Biomechanics; Newton's laws: Static C.G., Levers in the body, muscles and, and jaws of animals; Collisions.

***Prerequisite:* -**



91110 Medical Terminology {1} [1-1]

Introduction to Medical Terminology; Analyzing and Building of Medical terms: prefixes, roots, combining forms, and suffixes; The Organization of the Body; Integumentary System; Skeletal and Muscular System; Digestive System; Cardiovascular System; Respiratory System; Reproductive System; Nervous System.

Prerequisite: -

91210 Anatomy & Histology {3} [3-3]

Introduction to Anatomy & Histology; Theoretical descriptive studies of the human body; Study of various systems: Molecular level, Cellular, Tissue, Organs, Body System levels; Microscopic anatomy: Cells, Tissues, Organs, and Organ systems.

Prerequisite: **91110 Medical Terminology**
93115 Biology (2)

91212 Anatomy & Histology Lab. {1} [2-1]

Introduction; Practical study of the human body systems; Study of the microscopic anatomy: Cells, Tissues, Organs, and organ systems.

Prerequisite: -

91213 Physiology (1) {3} [3-3]

Introduction to Physiology; Human body; Normal functions and mechanism of various physiological systems: Nervous system, Cardiovascular system, Muscles system, Blood, and Respiratory system.

Prerequisite: **93115 Biology (2)**

91214 Physiology Lab. {1} [2-1]

Introduction; Principles of Practical Physiology; Hematology; Clinical Physiology; Blood Constituents: Quantitative Assay of Blood; Record, and measure of Blood Pressure; ECG; Human Vital Signs; Type of Injections.

Prerequisite: -

91215 Physiology (2) {2} [2-2]



Introduction; Normal functions and Homeostasis: Human nervous system, Sensory system, Gastrointestinal system, Endocrine system, Excretory system, and Reproductive system.

Prerequisite: 91213 Physiology (1)

91216 Pharmaceutical Organic Chemistry [2-2]

Introduction; Organic Medicinal compounds: Classification, preparation, and reaction; Heterocyclic compounds; Isomeric compounds; Pharmaceutical interest of some organic medicinal compounds.

Prerequisite: 93120 Organic Chemistry

91217 Pharmaceutical Organic Chemistry Lab. {1} [2-1]

Introduction; Identification of organic compounds according to their functional groups; Extraction of natural organic compounds: Nicotine, caffeine, and eugenol.

Prerequisite: -

91218 Analytical Chemistry {2} [2-2]

Introduction; Analytical process; Chemical measurements; Math Toolkit; Statistics; Gravimetric and Combustion Analysis; Acid base; Buffers; Acid base titrations; Polyprotic Acid and Base; EDTA titrations; Electrode Potentials; Redox titrations; Light; Beer's Law; Spectrophotometry; Principles of Chromatography

Prerequisite: 93112 General Chemistry (2)

91219 Analytical Chemistry Lab {1} [2-1]

Introduction; Glass calibration; Statistical Evaluation of Analytical Results; Gravimetric Determination of Chloride; Gravimetric Determination of Nickel; Determination of Acetic Acid in Vinegar; Evaluation the Calcium Ion Content in Dried Milk Powder; Determination of Vitamin C concentration by Redox Titration; Precipitation Titration.

Prerequisite: -

91230 Biochemistry (1) {2} [2-2]

Introduction to Biochemistry; Chemistry of Carbohydrates; Chemistry of Lipids; Chemistry of Free radicals; Chemistry of some trace elements; Metabolism: Carbohydrates, and Lipids; Clinical correlations; hormones and enzymes.

Prerequisite: 93115 Biology (2)
93120 Organic Chemistry



91231 Biochemistry (2) {2} [2-2]

Introduction; Metabolism of Amino acids; Metabolism of proteins; Metabolism of Nucleic acids; Metabolism of Enzymes, Metabolism of Vitamins; Clinical correlations; hormones and enzymes.

Prerequisite: 91230 Biochemistry (1)

91232 Biochemistry Lab. {1} [2-1]

Introduction; Biologically important chemical compounds; Qualitative and Quantitative determination: Carbohydrate, Lipids, Proteins, Amino acids, Enzymes, and Nucleic acid.

Prerequisite: -

91241 Physical Pharmacy {3} [3-3]

Introduction; States of Matter: Intermolecular bonds, States of matter, Crystalline solids and Polymorphism, Amorphous solids; Drug solubility: Types of solutions, Solubility of solids in liquids, solubility of solids in solids, Heat of solution; Kinetics and stability of drugs: Concentration effects, Temperature Effect, Effect of other factors, Stability Studies; Diffusion and dissolution; Rheology: Newtonian systems, Non-newtonian systems, Thixotropy; Interfacial Phenomena: liquid interfaces, solid interfaces, determination of interfacial tension, Adsorption.

Prerequisite: 93112 General Chemistry (2)
36129 General Physics

91241 Physical Pharmacy Lab. {1} [2-1]

Introduction; Physicochemical properties: Surface tension, Solubility, Viscosity, Incompatibility, Stability, Diffusion, and Adsorption.

Prerequisite: -

91316 Pathology {2} [2-2]

Introduction; Fundamental principles of pathophysiology; Cell and tissue injury; Acute and chronic inflammation; Tissue regeneration and repair; Disease of immune system; General pathology of infectious diseases; Neoplasia and hemodynamic disturbances.

Prerequisite: 91215 Physiology (2)

91331 Pharmacology (1) {3} [3-3]

Introduction to Pharmacology I; Principle of Pharmacodynamics and Pharmacokinetics; Routes of administration; General mechanisms of drug actions; Types of receptor ligands interactions; Drug affecting the autonomic nervous system; Drug affecting the cardiovascular system Drug affecting



Central nervous system; Drug Action mechanism; doses, adverse effects, and interaction with others drugs.

Prerequisite: 91215 Physiology (2)
91231 Biochemistry (2)

91332 Pharmacology (2) {3} [3-3]

Drug affecting Respiratory tract; Drug affecting Gastrointestinal tract; Drug affecting Endocrine system; Chemotherapy; Anti-inflammatory drugs; Drug Action mechanism: doses, adverse effects, and interaction with others drugs.

Prerequisite: 91331 Pharmacology (1)

91341 Pharmaceutics (1) {3} [3-3]

Introduction; Formulation; Compounding; Packing; Storing Dispensing; Different Pharmaceutical Calculations.

Prerequisite: 91241 Physical Pharmacy

91342 Pharmaceutics Lab (1) {1} [2-1]

Introduction; Pharmaceutical dosage forms; Aromatic Waters; Spirits; Elixirs; Tinctures; Drops; Lotions; Suspensions.

Prerequisite: -

91344 Pharmaceutics (2) {2} [2-2]

Non-sterile Preparations; Suspensions; Emulsions; Creams; Ointment; Pastes; Gels; Suppositories; Pessaries; Powders; Granules.

Prerequisite: 91341 Pharmaceutics (1)

91345 Pharmaceutics Lab (2) {1} [2-1]

Preparation of Emulsions Creams; Ointments; Pastes; Gels; Preparation of Suppositories according to International Pharmacopoeias

Prerequisite: -

91351 Pharmacognosy {3} [3-3]



Introduction to Pharmacognosy; Methods in Natural Products Chemistry; Macro and Microscopical characteristic of crude drugs: The Leaves and the herbs, Flowers and inflorescences, Seeds and fruits, Barks, Roots, Rhizomes, Bulbs, and Unorganized drugs; Carbohydrates.

***Prerequisite:* 91215 Physiology (2)**

91352 Pharmacognosy Lab. {1} [2-1]

Introduction; Macroscopic and microscopic examination of different drugs of natural origin: Starch, Leaves, Flowers, Fruits, Seeds, Barks, and subterranean organs; The polyuronides; Analytical Techniques in Pharmacognosy and Phytochemistry.

***Prerequisite:* -**

91359 Phytochemistry {3} [3-3]

Introduction to Phytochemistry; Pharmaceutically important secondary metabolites; Glycosides, Alkaloids, Terpenes, Volatile oil, and Resins; Isolation of natural products; Chromatography technique; Chemical and physical methods; Introduction to plant tissue techniques.

***Prerequisite:* 91351 Pharmacognosy**

91360 Phytochemistry Lab. {1} [2-1]

Introduction; Secondary metabolites: Extraction, Purification, and Identification (physically and chemically); Anthraquinone glycosides: Tannis; Saponin glycosides; Volatile oils; Flavonoids.

***Prerequisite:* -**

91374 Microbiology {3} [3-3]

Introduction; Fundamental concepts of microbiology; Microorganisms and their relation to disease; Classification and bacterial metabolism; Structure function and pathogenesis of viral and fungal disease in different organ systems.

***Prerequisite:* 91215 Physiology (2)**

91377 Microbiology Lab. {1} [2-1]

Introduction; Microorganisms: Isolation, Cultivation, Microscopic examination, and Bacterial counting; (GMP); Mode of action of antibiotics; Problems of natural and acquired microbial resistant to antimicrobial agents.

***Prerequisite:* -**



91378 Pharmaceutical Microbiology {2} [2-2]

Introduction; Biological properties of antibiotics and Mechanisms of action; The development of microorganism's resistance: Methods of sterilization, Chemical disinfectant, antiseptics, and preservatives; Microbial spoilage; Production of Therapeutically products by Recombinant DNA.

Prerequisite: -

91427 Medicinal Chemistry (1) {3} [3-3]

Introduction to Medicinal Chemistry; Physicochemical properties; Metabolism of drugs; Anti malarials agents; Tuberculostatic agents; Cytotoxic agents.

Prerequisite: **91331 Pharmacology (1)**
91216 Pharmaceutical Organic Chemistry

91427 Medicinal Chemistry Lab. {1} [2-1]

Introduction; Medicinally important organic compounds; Synthetic pathways; Systematic identification of selected groups of medicinal agents; Synthesis of other medicinally important organic compounds.

Prerequisite: -

91428 Medicinal Chemistry (2) {3} [3-3]

Chemistry and mechanism of action; Analgesics; Anesthetics; CNS; Stimulants; Anti-hypertensive drugs; Diuretics.

Prerequisite: **91427 Medicinal Chemistry (1)**

91433 Toxicology {2} [2-2]

Introduction to Toxicology; Disposition of toxic compounds; Metabolism of foreign compounds; Types of exposure and response; Drugs as toxic substances; Industrial toxicology; Food additives and contaminants; Pesticides; Environmental pollutants; Natural products; Household products; Toxicity testing and risk assessment.

Prerequisite: **91332 Pharmacology (2)**

91434 Pharmacology & Toxicology Lab. {1} [2-1]

Introduction; Study the animal handling; Dosing; Poisons; Identification poisons, and quantification of poisons.

Prerequisite-



91445 Industrial Pharmacy (1) {3} [3-3]

Introduction; Manufacturing of pharmaceuticals; Basic principles of industrial processes: Mixing, Milling, Drying, Sterilization; Transfer processes; Unit operation.

***Prerequisite:* 91344 Pharmaceutics (2)**

91447 Industrial Pharmacy (2) {2} [2-2]

Introduction; Design of dosage forms: Tablets, Coating, Capsules, and (cGMP); Physicochemical factors: Formulation, and Manufacturing; Pharmaceutical stability; Testing and packaging.

***Prerequisite:* 91445 Industrial Pharmacy (1)**

91448 Industrial Pharmacy Lab {1} [2-1]

Introduction to Industrial Pharmacy; Formulation; Pharmaceutical quality control: Tablets, Capsules, Suspensions, and Emulsions; Sustained release preparations.

***Prerequisite:* -**

91471 First Aid {1} [1-1]

Introduction; Manufacturing of pharmaceuticals; Basic principles of industrial processes: Mixing, Milling, Drying, Sterilization; Transfer processes; Unit operation.

***Prerequisite:* 91215 Physiology (2)**

91474 Immunology {2} [2-2]

Introduction to Immunology; Basic principle; Immune response; humeral and cellular immune response; Immunological disorder: Hypersensitivity, Tissue rejection, and Autoimmune disease; Tumor immunology.

***Prerequisite:* 91374 Microbiology**

91481 Biopharmaceutics and Pharmacokinetics {3} [3-3]

Introduction; compartment model: I.V bolus dose, Linear model, and First order kinetics; Calculation of area under the curve; Clearance of drugs; Intravenous infusion; Oral drug administration; Single and multiple doses; Differences and design of dosage regimen: kinetics of drug absorption, Drug distribution, Drug metabolism, and drug elimination.



Prerequisite: 91344 Pharmaceutics (2)
91332 Pharmacology (2)

91482 Biopharmaceutics and Pharmacokinetics Lab. {1} [2-1]

Introduction; Data analysis technology; Calculation of area under the curve: Linear model, and First order kinetics.

Prerequisite: -

91483 Clinical Biochemistry {3} [3-3]

Introduction to Clinical Biochemistry; Normal function of body system; Acid-base balance: Kidney, Renal outcome, Gastrointestinal tract, Liver enzymes, and Hormones; Cardiac performance; Lipids, lipoproteins; Diabetes; Bone and the metabolic aspect of tumor.

Prerequisite: 91331 Pharmacology (1)
91231 Biochemistry (2)

91484 Clinical Biochemistry Lab {1} [2-1]

Introduction to Clinical Biochemistry; Normal function of body system; Acid-base balance: Kidney, Renal outcome, Gastrointestinal tract, Liver enzymes, and Hormones; Cardiac performance; Lipids, lipoproteins; Diabetes; Bone and the metabolic aspect of tumor.

Prerequisite: -

91524 Drug Design and Synthesis {2} [2-2]

Introduction to Drug Design; Rational design; Mechanisms of drug action; Quantitative structure activity relationship (QSAR); Unconventional mechanisms of drugs: Antiviral drugs.

Prerequisite: 91428 Medicinal Chemistry (2)

91536 Drug Information and Poison Control {2} [2-2]

Introduction; Drug and Poisons literature; Resources; Documentation of drug information; Drug-profile of essential drugs; Drug Information center; Poison control centers.

Prerequisite: 91433 Toxicology

91538 Pharmacy Practice {1} [1-1]

Introduction to Pharmacy Practice; Pharmacy profession and practice; job description of pharmacists in different settings; Pharmacy practice topics related to OTC drugs.

Prerequisite: 91332 Pharmacology (2)



91344 Pharmaceutics (2)

91540 Drug Delivery Systems {2} [2-2]

Introduction to Drug Delivery System; Non-conventional drug delivery systems; Transport systems.

Prerequisite: 91332 Pharmacology (2)
91481 Biopharmaceutics and Pharmacokinetics

91541 Cosmetics {2} [2-2]

Introduction to Cosmetics; Dentifrices; Antiperspirant; Deodorants; Emollients; Aerosols; Colored Make-Up Preparations; Anti-acne preparation; Hair colorants; Epilation and Depilation methods.

Prerequisite: 91447 Industrial Pharmacy (2)

91544 Seminar in Pharmaceutical Sciences {1} [1-1]

Introduction; Communication Skills; How to write and present a research paper; Presentation Training.

Prerequisite: 91447 Industrial Pharmacy (2)
91481 Biopharmaceutics and Pharmacokinetics

91557 Drug Analysis and Control {2} [2-2]

Introduction; Purity of raw materials; Quality control of pharmaceutical preparation; Instrumental Analysis: HPLC, GLC, UV, and Titimetry; Introduction of quality control concepts; TRQ in pharmaceutical industry.

Prerequisite: 91447 Industrial Pharmacy (2)

91558 Drug Analysis and Control Lab. {1} [2-1]

Introduction; Assay of Mefenamic acid using HPLC; Identification of Mefenamic acid using IR; Assay of Metformin using spectrophotometer; Detection of impurities using optical rotation; Dissolution test for Clindamycine capsules; Pharmaceutical dosage forms using compendia methods.

Prerequisite: -

91576 Pharmaceutical Biotechnology {2} [2-2]

Introduction; Cell and Gene expression; rDNA Technology and application; Recombinant Protein Technology and applications; Biotech Products; Formulation of Biotech products Microbiological



consideration; Animal Cloning and Genetic Engineering; Plant Genetic Engineering; Gene Therapy; Vaccines; Monoclonal Antibodies.

Prerequisite: 91374 Microbiology
91231 Biochemistry (2)

91585 Clinical Pharmacy and Therapeutics (1) {3} [3-3]

Introduction; Clinical pharmacy practice: patient interview, patient counseling, monitoring drug interactions, patient-drug profile, and patient compliance; Cardiovascular disorders; Congestive heart failure; Angina pectoris; Respiratory disorders; Gastrointestinal disorders; Diarrhea; Constipation; Rheumatic disease; Endocrine and metabolic disease; Thyroid disorders; Hyperlipidemia.

Prerequisite: 91483 Clinical Biochemistry

91588 Clinical Pharmacy and Therapeutics (2) {2} [2-2]

Introduction; Disease of the Blood; Anemia, Sickle Cell disease; Renal Disease; Hepatic and Pancreatic Disorders; Skin Disease; Neurological Disorders; Headaches; Parkinsonism; Seizure Disorders; Infectious disorders; Tuberculosis, and HIV.

Prerequisite: 91585 Clinical Pharmacy and Therapeutics (1)

91589 Clinical Pharmacy and Therapeutics Lab {1} [2-1]

Introduction; Patient-drug profiles; Case Study: Clinical investigations, and monitoring possible drug interactions.

Prerequisite: -

91582 Clinical Nutrition {2} [2-2]

Introduction to Nutrition; Carbohydrates; Fats; Proteins; Minerals and vitamins; Life cycle Nutritional requirements.

Prerequisite: 91585 Clinical Pharmacy and Therapeutics (1)

91592 Pharmacy Legislations and Pharmacy Orientation {2} [2-2]

Introduction; Ethics and laws regulating the pharmacy profession; Practice in Jordan; Arabic and International pharmaceutical organizations.



Prerequisite: -

91594 Biostatistics {2} [2-2]

Introduction; Basic concepts; kind of Statistical studies; Graphical Presentation of data; Measure of Central Tendency; Measure of Variability; Z-Score; Hypothesis testing; Correlation; Regression; Analysis of variance.

Prerequisite: 36112 Calculus

55131 Pharmacoeconomics & Marketing {3} [3-3]

Introduction; Foundation of Marketing; Consumer behavior; Marketing Mix 4P's; product concepts; Factors influencing Prescription; Competitors; Promotion; Marketing Environment; Sales Technique.

Prerequisite: 91332 Pharmacology (2)

29101 Introduction to special education {3} [3-3]

Introduction; Special education; Mental retardation: Hearing impairment, Visual impairment, and Physical impairment; Learning disabilities; Emotional disturbance; Autism; Speech and language disorders; Talent and giftedness.

Prerequisite: -

26152 Principles of Guidance and Conselling {2} [2-2]

Introduction; Counseling and Guidance; Counseling as science and art; Personal qualities of effective helper; Scope of practice; Ethical and legal aspects of counseling.

Prerequisite: -