

2nd stage ; 2nd Semester

المرحلة الثانية: الفصل الدراسي الثاني

Title of the course: Pharmacognosy I العقاقير-1

Credit hours/week: **Theory 3 Practical 2**

Reference text: *Trease and Evans Pharmacognosy; 15th ed., 2000.*

Objectives: This course is intended to study the scope of pharmacognosy, Medicinal plant nomenclature, classification of natural products, phytochemistry which include extraction and isolation of active constituents from natural sources.

Pharmacognosy I

- General Introduction: The Scope of Pharmacognosy, definitions and basic principles.3
- Drugs from natural sources, crud drugs, official and nonofficial drugs.1
- Classification of natural products. 2
- Plant nomenclature and taxonomy. 2
- Production of crude drugs: Cultivation, collection, drying and storage. 3
- Deterioration of crude natural products. 1
- Chemistry of natural drug products. 3
- Quality control: Evaluation of natural products; macroscopical evaluation; physical evaluation; chemical evaluation; biological evaluation; spectroscopical evaluation.4
- Phytochemical investigation of herbal products: Extraction of the plant material; separation and isolation of constituents; characterization of the isolated compounds.4
- Separation technique: Introduction; Mechanisms of separation and classification based on the type of technique; paper chromatography; Thin layer chromatography; Ion exchange chromatography; Gel filtration chromatography; Column chromatography; Gas chromatography; HPLC; Electrophoresis; Affinity chromatography. 15
- Traditional plant medicines as a source of new drugs. Bioassay-guided fractionation 3
- Tissue culture of medicinal plant: Introduction and history; laboratory of the plant tissue culture; aseptic techniques. Application of the plant tissue culture; environmental and biological control; plant growth regulators. 4

Title of the course: Organic Chemistry III الكيمياء العضوية-3

Credit hours/week: **Theory 2 Practical 2**

Reference text: *1- Organic Chemistry by Robert T. Morrison and Robert N. Boyd, latest edition. 2- Organic Chemistry by J. McMurry, latest ed., Thomason*

learning, CA, USA. 3_ An introduction to the chemistry of heterocyclic compound by Acheson, R. M. latest ed.

Objectives: To teach students the principles of heterocyclic chemistry including the fundamental principles and the features, classes and reactions of heterocyclic compounds; it enable students to apply these principles in complicated reactions that involve heteroatoms.

Organic Chemistry III

- Heterocyclic system: Classes of heterocyclic systems; general structures; properties; Occurrence in nature and in medicinal products. 5
- Five-membered ring heterocyclic compounds: pyrrole; furan and thiophen. 3
- Source of pyrrole, furan and thiophen. 2
- Electrophilic substitution in pyrrole, furan and thiophen: Reactivity and orientation.5
- Six-membered ring heterocyclic compounds: Structure & reactions of pyridine. 4
- Saturated five-membered heterocyclic compounds. 6
- Heterocyclic of five & six member rings with two & three heteroatoms. 5

Title of the course: Medical Microbiology II الأحياء المجهرية الطبية -2 (Medical Virology, immunology, and Parasitology)

Credit hours/week: **Theory 2 Practical 2**

Objectives: provide a basic understanding of the morphology, anatomy, physiology and genetics of bacteria in addition, the methods of handling, visualizing, characterizing identifying of bacterial disease.

Microbiology II

- **Introduction.** 1

Intestinal and tissue protozoa (Amoeba (pathogenic and non-pathogenic), Balantidium, Giardia, Trichomonas Chilomastix) 4

- Hemoflagellates: Leishmania spp.; Trypanosome spp. 4
- Sporozoa: Malarial parasites of human; Toxoplasma. 3
- Helminthes: Classification, Cestodes (Hymenolepis nana, Tenia spp.), Echinococcus (Hydatid cyst). Hepatic flukes, Trematodes (Blood Flukes: Schistosoma spp).
- Nematods: Ascaris, Entrobilus. Trichuris, Ancylostoma, Necator americans. 8
- **Virology:** Introduction, Comparison between viruses and Bacteria and other microbes; origin of viruses, reproduction, one step growth curve, type of mutations and Classification of viruses; RNA viruses: Orthomyxo viruses; Paramyxo viruses; Retro viruses; Hepato viruses; Oncogenic viruses. DNA viruses: Herpes viridae; poxviradeae, adenoviredeae, parvoviruses 10

- **Immunology:** introduction, innate and adaptive immunity, complement, MHC molecule and autoimmune diseases, hypersensitivity, tumor immunity, immunodeficiency, immunological methods. 15

Title of the course: Physical Pharmacy II الصيدلة الفيزيائية -2

Credit hours/week: **Theory 3 Practical 2**

Reference text: *Physical Pharmacy by Alfred Martin et al.*

Objectives: To understand the application of quantitative and theoretical principles of the physical characters of matter in the practice of pharmacy. It aids the pharmacists in their attempt to predict the solubility, compatibility and biological activity of drug products. As a result of this knowledge it will help in the development of new drugs and dosage forms as well as in improvement of various modes of administration.

Physical Pharmacy II

- Solubility and distribution phenomena, solvent-solute interactions, solubility of gases in liquids, solubility of liquids in liquids, solubility of non-ionic solids in liquids, distribution of solutes between immiscible solvents. 10
- Complexation, classification of complexes, methods of analysis, thermodynamic treatment of stability constants. 5
- Kinetics, rate and orders of reactions, influence of temperature and other factors on reactions rate, decomposition of medicinal agents and accelerated stability analysis. 9
- Interfacial phenomena, liquid interfaces, surface free energy, measurement of interfacial tension, spreading coefficient, surface active agents and wetting phenomena. 5
- Colloids, dispersed system and its pharmaceutical application, types of colloidal systems, kinetic properties, diffusion, zeta potential, solubilization. 5
- Micrometrics, particle size, methods of determining particle size, particle shape and surface area, porosity, density. 3
- Rheology, Newtonian systems, thixotropy measurement, Negative thixotropy, determination of thixotropy. 5
- Polymer science, definitions pharmaceutical applications, molecular weight averages. 3

Title of the course: Physiology II الفسلجة -2

Credit hours/week: **Theory 3 Practical 2**

Reference text: *Review of Medical Physiology; Ganong W.F (Ed.); 2005.* and *Textbook of Medical Physiology by Guyton AC; latest edition.*

Objectives: To enable students understanding the basic principles of physiological functions of different tissues and organs of the human being, and how to evaluate these functions and correlate them with the normal and abnormal conditions. It also emphasizes on the role of homeostatic and hemodynamic changes in the integration of physiological status.

Physiology II

- Gastrointestinal function: Digestion and absorption of carbohydrates; proteins; lipids; absorption of water and electrolytes; vitamins and minerals; regulation of gastrointestinal function: Introduction; gastrointestinal hormones; mouth and esophagus; stomach; exocrine portion of the pancreas; liver and biliary system; small intestine; colon. 10
- Circulatory body fluid: Introduction; blood; bone marrow; white blood cells; immunity; platelets; red blood cells; anemia; polycythemia; blood group and Rh factor; hemostasis: The clotting mechanism / blood coagulation tests; anticlotting mechanism; the plasma; the lymph; abnormalities of hemostasis. 15
- Endocrinology: Introduction; energy balance, metabolism and nutrition; the pituitary gland; the thyroid gland; the gonads: development and function of the reproductive system; the adrenal medulla and adrenal cortex; hormonal control of calcium metabolism and the physiology of the bone; endocrine functions of the pancreas and regulation of carbohydrate metabolism. 20