**Baghdad College of medical sciences / department of Pharmacy**
**Syllabus**

| Second stage | | |
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| **1st semester** | **Lecture title** | **Hours** |
| Title of the course: **Organic Chemistry II** Course number: 211<br>Reference text:<br>1- Organic Chemistry by Robert T. Morrison and Robert N. Boyd.<br>2- Organic Chemistry by McCurry; 5th ed.; Thomason learning; CA,USA 2000.<br>**Objectives**: To enable students to understand the chemistry of carbon, and the classification, properties and reactions of organic compounds. It includes understanding the basic structure and properties of organic halides, carboxylic acids, aldehydes, ketones and amines, in addition to the principles and application of stereochemistry on these compounds. | | |
| **Organic Chemistry II** | Aromatic Hydrocarbons (includes benzene, electrophilic aromatic substitution, arenas and their derivatives). | 10 |
| | Carboxylic acids: properties and reactions. | 5 |
| | Functional derivatives of carboxylic acids. | 7 |
| | Amines I and II. | 6 |
| | Aldehydes and ketones (include also aldol and Claisen condensation); Classification, reactions and properties. | 12 |
| | Phenols. | 5 |
| Title of the course: ***Medical Microbiology*** Course number: **212**<br>Credit hours: **Theory 3 hours Laboratory 1 hour**<br>Reference text: *1.**Medical Microbiology, seventeenth edition E .Jawetz, J.L. Melnick, E.A. Adel 1987 & 2. Principles of microbiology by Roland M**.* | | |
| **Medical Microbiology I** | Introduction: Importance of microbiology, History of microbiology | 2 |
| | Anatomy of bacteria: Surface appendages, Capsule, Cell wall of G +ve & G –ve bacteria, Cytoplasmic membrane. | 2 |
| | Bacterial physiology: Physical and chemical growth determinate, growth and growth curves, bacterial reproduction. | 3 |
| | Genetics: Definition, genetic, element, mutation (spontaneous, Gene transfer, transformation, conjugation, and gene transduction). | 2 |
| | Recombinant DNA biotechnology. | 1 |
| | Sporulation and germination. | 1 |
| | Sterilization (chemical + physical Methods). | 2 |
| | Chemotherapy and sensitivity test | 3 |
| | Staphylococci species | 3 |
| | Streptococcus species | 3 |
| | Aerobic Spore-forming bacteria Bacillus species (*B. anthracis*, *B. subtilis*, *B. cereus*). | 2 |

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| | *Clostridium perfringens*; *Clostridium tetani*; *Clostridium botulinun* | 3 |

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| | *Corynebacterium diphtheriae* | 2 |
| | *Propionibacterium acnes, Listeria* | 2 |
| | *Mycobacterium tuberculosis*; *M. leprae* | 2 |
| | Enterobacteriaceae: (*E. coli; Klebsiella spp.; Citrobacter , Serratia, Salmonella, Shigella*) | 6 |
| | , Vibrio, Pseudomonas, Helicobacter pylori, Neisseria spp., Brucella, Proteus, | 6 |

Title of the course: ***Physiology* I** Course number: **214**
Level: **2nd Class, 1st Semester**

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

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| Physiology I | The general and cellular basis of medical physiology. | 5 |
| | Physiology of nerves and muscles: Nerve cells; excitation and conduction; Properties of mixed nerves; glia; neurotrophins; Nerve fiber types and functions; Muscles: Skeletal muscle; smooth muscle; cardiac muscle. Synaptic transmission: Reflexes; cutaneous, deep and visceral sensations; alert behavior, sleep and electrical activity of the brain; control of posture and movement; higher function of the nervous system; central regulation of visceral function; the autonomic nervous system. | 16 |

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| | Respiration: Respiratory zones; Mechanics of respiration; air volumes; respiratory muscles; compliance of the lungs and chest wall; surfactants; differences in ventilation and blood flow in deferent parts of the lung; Dead space and uneven ventilation; Pulmonary circulation: Pressure, volume and flow. Gas transport between the lungs and tissue; Regulation of respiration: Neural control of breathing; Respiratory centers; Regulation of respiratory activity: Chemical factors; non chemical factors; Respiratory adjustment in health and disease; Effect of exercise; Hypoxia; Emphysema; Asthma. | 8 |
| | Renal Physiology: Introduction; innervations of the renal vessels; renal clearance; renal blood flow; glomerular filtration rate (GFR): Measurements; factor affecting GFR; Filtration fraction; reabsorption of $Na^+$, $Cl^-$ and glucose. Tubuloglomerular feedback and glomerulotubular balance; water excretion in: proximal tubules; loop of henle; distal tubules; collecting ducts; the counter current mechanism; role of urea; water diuresis and osmotic diuresis; acidification of the urine: $H^+$ secretion; reaction with buffers; ammonia secretion; factors affecting acid secretion; bicarbonate execration; regulation of $Na^+$, $K^+$ and $Cl^-$ excretion; uremia; acidosis; micturition. | 8 |
| | Cardiovascular system: origin and spread of cardiac excitation; the electrocardiogram; cardiac arrhythmias; electrographic findings in cardiac diseases; mechanical events of the cardiac cycle; cardiac output; cardiovascular regulatory mechanisms: Local regulatory mechanisms; systemic regulation by the nervous system; systemic regulation by hormones; Coronary circulation; Hypertension; Heart failure; Angina pectoris. | 8 |

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Title of the course: ***Physical Pharmacy* I** Course number: **213**
Level: 2nd Class, 1st Semester
Credit hours/week : **Theory 3 Laboratory 1**
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.

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| Physical Pharmacy I | States of matter, binding forces between molecules, gases, liquids, solid and crystalline matters; phase equilibria and phase rule; thermal analysis. | 10 |
| | Thermodynamics, first law, thermochemistry, second law, third law, free energy function and applications. | 8 |
| | Solutions of non-electrolytes, properties, ideal and real Colligative properties, molecular weight determination. | 7 |
| | Solution of electrolytes, properties, Arrhenius theory of dissociation, theory of strong electrolytes, ionic strength, Debye-Huchle theory, coefficients for expressing colligative properties. | 5 |
| | Ionic equilibria, modern theories of acids, bases and salts, acid-base equilibria, calculation of pH, acidity constants, the effect of ionic strength and free energy. | 8 |
| | Buffered and isotonic solutions: Buffer equation; buffer capacity; methods of adjusting tonicity and pH; buffer and biological system. | 7 |
| **References text :Liz and John Soar, New Headway Plus – Pre-Intermediate. Oxford: Oxford** | | |
| **English** | Getting to know you. | 4 |
| | The way we live | 5 |
| | It all went wrong | 4 |
| | Let's go shopping | 4 |
| | What do you want to do? | 4 |
| | Tell me! What's it like? | 4 |

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| | Famous couples | 5 |
| **2nd semester** | **Lecture Title** | **Hours** |
| Title of the course: ***Pharmacognosy* I** Course number: **2210**<br>Level: 2nd Class, 2nd Semester<br>Credit hours/week : **Theory 3** **Laboratory 1**<br>Reference text: ***Trease and Evans Pharmacognosy; 15th ed., 2000.*** | | |
| Pharmacognosy I | General Introduction: The Scope of Pharmacognosy, definitions and basic principles. | 3 |
| | Drugs from natural sources, crud drugs, official and non-official 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 |

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| Title of the course: ***Organic Chemistry*** **III** Course number: **226**<br>Level: 2nd Class, 2nd Semester<br>Credit hours/week : **Theory 2 Laboratory 1**<br>Reference text: ***1- Organic Chemistry by Robert T. Morrison and Robert N. Boyed, 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.*** | | |
| Organic ChemistryIII | 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 MicrobiologyII*** **(Medical Virology, immunology, and Parasitology)** Course number: **212**<br><br>**Objectives**: provide a basic understanding of the morphology, anatomy, physiology and genetics of bacteria in addition, the methods of handling, visualizing, characterizing | | |
| **Microbiology II** | Introduction. | 1 |
| | Intestinal and tissue protozoa (Amoeba (pathogenic and non pathogenic), Balantidium, Giardia, Trichomonas | 4 |
| | Haemoflagellates: Leishmania spp.; Trypanosome spp. | 4 |
| | Sporozoa: Malarial parasites of human; Toxoplasma. | 3 |
| | Helminthes: Classification, Cestodes (Hymenolepis nana, Taenia spp.), Echinococcus (Hydatid cyst).<br>Hepatic flukes, Trematodes (Blood Flukes: Schistosoma spp).<br>Nematods: Ascaris, Entrobius. Trichuris, Ancylostoma, Necator americans. | 8 |

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| | 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** Course number: **228**<br>Level: 2nd Class, 2nd Semester<br>Credit hours/week : **Theory 3 Laboratory 1**<br>Reference text: ***Physical Pharmacy by Alfred Martin et al.*** | | |
| **Physical PharmacyII** | 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 eight averages. | 3 |

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Title of the course: ***Physiology* II** Course number: **229**
Level: **2nd Class, 2nd Semester**

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

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| 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; anti clotting 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 |
| **Refinances text : Liz and John Soar, New Headway Plus – Pre-Intermediate. Oxford: Oxford University Press** | | |
| **English** | Do's and Don'ts | 5 |
| | Going places | 4 |
| | Scared to death | 4 |
| | Things that changed the word | 4 |

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| | Dreams and reality | 4 |
| | Earning living | 4 |
| | Love you and leave you | 5 |