

**University of Alayen**

**College of Pharmacy**

**Department of Pharmaceutical Chemistry**

Title of the course: **Organic Chemistry II** Course number: **211**

Level: 2<sup>nd</sup> Class, 1<sup>st</sup> Semester

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

Reference text:

*1- Organic Chemistry by Robert T. Morrison and Robert N. Boyd.*

*2- Organic Chemistry by McCurry; 5<sup>th</sup> ed.; Thomason learning; CA,USA 2000 .*

**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.

No	Lecture title	hours
1	Aromatic Hydrocarbons (includes benzene, electrophilic aromatic substitution, arenes and their derivatives).	10
2	Carboxylic acids: properties and reactions.	5
3	Functional derivatives of carboxylic acids.	7
4	Amines I and II.	6
5	Aldehydes and ketones (include also aldol and Claisen condensation); Classification, reactions and properties.	12
6	Phenols.	5

**University of Alayen**

**College of Pharmacy**

**Department of Pharmacology and Toxicology**

Title of the course: *Physiology I* Course number: **214**

Level: **2<sup>nd</sup> Class, 1<sup>st</sup> 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

No	Lecture title	hours
1	The general and cellular basis of medical physiology.	5
2	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
3	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
4	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 <sup>+</sup> , Cl <sup>-</sup> 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 <sup>+</sup> secretion; reaction with buffers; ammonia secretion; factors affecting acid secretion; bicarbonate excretion; regulation of Na <sup>+</sup> , K <sup>+</sup> and Cl <sup>-</sup> excretion; uremia; acidosis; micturition.	8

5	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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**University of Alayen**  
**College of Pharmacy**  
**Department of Clinical Laboratory Sciences**

Title of the course: *Medical Microbiology* Course number: 212

Level: 2<sup>nd</sup> Class, 1<sup>st</sup> Semester

Credit hours: **Theory 3 hours Laboratory 1 hour**

Reference text: 1. *Medical Microbiology, seventeenth edition E .Jawetz, J.L. Melnick, E.A. Adel 1987* & 2. *Principles of microbiology by Roland M .*

**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.

No.	Lecture title	hours
1	Importance of microbiology, History of microbiology	2
2	Anatomy of bacteria: Surface appendage, Capsule, Cell wall of G.+ve & G -ve bacteria, Cytoplasmic membrane.	2
3	Bacterial physiology: Physical and chemical growth determinate, growth and growth curves, bacterial reproduction.	2
4	Genetics: Definition, genetic, element, mutation (spontaneous, gene transfer, transformation, conjugation, and gene transduction).	2
5	Recombinant DNA biotechnology.	2
6	Sporulation and germination.	2
7	Sterilization (chemical + physical Methods).	2
8	Chemotherapy.	2
9	Morphology of Bacteria, Staining and Classification.	1
10	Staphylococci species: <i>Streptococcus pyogenes</i> ; <i>Streptococcus pneumoniae</i>	3
11	Aerobic Spore-forming bacteria Bacillus species ( <i>B. anthracis</i> , <i>B. subtilis</i> , <i>B. ceseus</i> ).	1

12	<i>Clostridium perfringens</i> ; <i>Clostridium tetani</i> ; <i>Clostridium botulinum</i>	3
13	<i>Corynebacterium diphtheriae</i>	1
14	<i>Propionibacterium acnes</i> , <i>Listeria</i>	1
15	<i>Mycobacterium tuberculosis</i> ; <i>M. leprae</i>	1
16	Chlamydiae; Actinomycetes	2
17	Identification & classification of G -ve bacteria	1
18	Enterobacteriaceae: <i>E. coli</i> ; <i>Klebsiella</i> spp.; <i>Citrobacter</i> , <i>Serratia</i> ,	4

**University of Alayen**  
**College of Pharmacy**  
**Department of Pharmaceutics**

Title of the course: *Physical Pharmacy I* Course number: **213**

Level: 2<sup>nd</sup> Class, 1<sup>st</sup> 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.

No	Lecture title	hours
1	States of matter, binding forces between molecules, gases, liquids, solid and crystalline matters; phase equilibria and phase rule; thermal analysis.	10
2	Thermodynamics, first law, thermochemistry, second law, third law, free energy function and applications.	8
3	Solutions of non-electrolytes, properties, ideal and real colligative properties, molecular weight determination.	7
4	Solution of electrolytes, properties, Arrhenius theory of dissociation, theory of strong electrolytes, ionic strength, Debye-Huchle theory, coefficients for expressing colligative properties.	5
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
6	Buffered and isotonic solutions: Buffer equation; buffer capacity; methods of adjusting tonicity and pH; buffer and biological system.	7

**University of Alayen**

**College of Pharmacy**

Title of the course: *Arabic univ.code*

Level: 2<sup>st</sup> Class, 1<sup>semester</sup>

Credit hours/week : 2

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**College of Pharmacy**

Title of the course: *Democracy univ.code*

Level: 2<sup>st</sup> Class, 1semester

Credit hours/week : 1



**University of Alayen**  
**College of Pharmacy**  
**Department of Clinical Pharmacy**

Title of the course: *Communication Skills* Course number: **215**

Level: 2<sup>nd</sup> Class, 2<sup>st</sup> Semester

Credit hours: **Theory 2 hours Laboratory --**

Reference text:

*1-Robert S. Beardsley, (ed.); Communication Skills in Pharmacy Practice, 5<sup>th</sup> edition.*

*2-Bruce A. Burger (ed.), Communication Skills for Pharmacists; American Pharmacists Association; 2<sup>nd</sup> ed.*

**Objectives:** Communication skill is one of the missions of pharmacy care practice, aims to develop a conventional relationship between pharmacist and patients, in which information is exchanged, hold in confidence and used to optimize patient care through appropriate drug therapy. This course is intended to pharmacist provide better care to patients, and focus on communication skills necessary to build the kind of relationship that result

No	Lecture title	hours
1	Patient-Centered Communication in Pharmacy Practice	2
2	Principles and Elements of Interpersonal Communication	2
3	Nonverbal type of communication.	2
4	Barriers to communication.	2
5	Listening and empathic responding during communication.	2
6	Assertiveness.	2
7	Interviewing and assessment.	2
8	Helping patients to manage therapeutic regimens.	2
9	Patient counseling; counseling check list; point-by-point discussion; counseling scenario.	2

10	Medication safety and communication skills.	2
11	Strategies to meet specific needs.	2
12	Communicating with children and elderly about medications.	2
13	Communication skills and inter-professional collaboration.	2
14	Electronic communication in healthcare.	2
15	Ethical behavior when communicating with patients.	2

**University of Alayen**  
**College of Pharmacy**  
**Department of Clinical Laboratory Sciences**

Title of the course: *Medical Virology and Parasitology* Course number: **227**

Level: 2<sup>nd</sup> Class, 2<sup>nd</sup> Semester

Credit hours: **Theory 2 hours Laboratory 1 hour**

Reference text: *Animal Agents and Vectors of Human Disease. 5<sup>th</sup> .Ed. P.C. Beaver & R.C. Jung.*

**Objectives:** To provide the student with knowledge of the pathogenesis, morphology, laboratory diagnosis, identification, pathology, and clinical features of medically important parasitic and viral diseases and the basic concepts of immunizing procedure against these diseases.

No	Lecture title	hours
1	Introduction.	3
2	Intestinal protozoa (Amoeba, Balantidium, Giardia, Chilomastix)	5
3	Haemoflagellates: Leshmania spp.; Trypanosome spp.	4
4	Sporozoa: Malarial parasites of human; Toxoplasma.	4
5	Helminthes: Classification, Flukes: Hepatic flukes, Blood flukes (Schistosoma spp). Tap worms: Taenia spp., Echinococcus (Hydatid cyst). Nematods: Ascaris, Entrobilus.	10
6	Virology: Introduction, Comparison between viruses and bacteria and other microbes; Classification of viruses; Replication; Chemotherapy; <i>Herpes viridae</i> ; Orthomyxo viruses; Paramyxo viruses; Retro viruses; Hepato viruses; Oncogenic viruses.	16

**University of Alayen**

**College of Pharmacy**

**Department of Pharmaceutical Chemistry**

Title of the course: *Organic Chemistry III* Course number: **226**

Level: 2<sup>nd</sup> Class, 2<sup>nd</sup> Semester

Credit hours/week : **Theory 2 Laboratory 1**

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.

No	Lecture title	hours
1	Heterocyclic system: Classes of heterocyclic systems; general structures; properties; Occurrence in nature and in medicinal products.	5
2	Five-membered ring heterocyclic compounds: pyrrole; furan and thiophen.	3
3	Source of pyrrole, furan and thiophen.	2
4	Electrophilic substitution in pyrrole, furan and thiophen: Reactivity and orientation.	5
5	Six-membered ring heterocyclic compounds: Structure & reactions of pyridine.	4
6	Saturated five-membered heterocyclic compounds.	6
7	Heterocyclic of five & six member rings with two & three heteroatoms.	5

**University of Alayen**

**College of Pharmacy**

**Department of Pharmacognosy**

Title of the course: **Pharmacognosy I** Course number: **2210**

Level: 2<sup>nd</sup> Class, 2<sup>nd</sup> Semester

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

Reference text: *Trease and Evans Pharmacognosy; 15<sup>th</sup> 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

No	Lecture title	hours
1	General Introduction: The Scope of Pharmacognosy, definitions and basic	3
2	Drugs from natural sources, crud drugs, official and non-official drugs.	1
3	Classification of natural products.	2
4	Plant nomenclature and taxonomy.	2
5	Production of crude drugs: Cultivation, collection, drying and storage.	3
6	Deterioration of crude natural products.	1
7	Chemistry of natural drug products.	3
8	Quality control: Evaluation of natural products; macroscopical evaluation; physical evaluation; chemical evaluation; biological evaluation; spectroscopical	4
9	Phytochemical investigation of herbal products: Extraction of the plant material; Separation and isolation of constituents; characterization of the isolated	4
10	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	15
11	Traditional plant medicines as a source of new drugs. Bioassay-guided	3
12	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

**University of Alayen**  
**College of Pharmacy**  
**Department of Pharmaceutics**

Title of the course: *Physical Pharmacy II* Course number: 228

Level: 2<sup>nd</sup> Class, 2<sup>nd</sup> 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.

No	Lecture title	hours
1	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
2	Complexation, classification of complexes, methods of analysis, thermodynamic treatment of stability constants.	5
3	Kinetics, rate and orders of reactions, influence of temperature and other factors on reactions rate, decomposition of medicinal agents and accelerated stability analysis.	9
4	Interfacial phenomena, liquid interfaces, surface free energy, measurement of interfacial tension, spreading coefficient, surface active agents and wetting phenomena.	5
5	Colloids, dispersed system and its pharmaceutical application, types of colloidal systems, kinetic properties, diffusion, zeta potential, solubilization.	5
6	Micrometrics, particle size, methods of determining particle size, particle shape and surface area, porosity, density.	3
7	Rheology, Newtonian systems, thixotropy measurement, negative thixotropy, determination of thixotropy.	5
8	Polymer science, definitions pharmaceutical applications, molecular weight averages.	3

**University of Alayen**

**College of Pharmacy**

**Department of Pharmacology and Toxicology**

Title of the course: *Physiology II* Course number: **229**

Level: **2<sup>nd</sup> Class, 2<sup>nd</sup> 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.

No	Lecture title	hours
1	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
2	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
3	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