

**University of Alayen**  
**College of Pharmacy**  
**Department of Pharmaceutical Chemistry**

Title of the course: *Analytical Chemistry* Course number: **113**

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

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

Reference text: *Fundamentals of Analytical Chemistry by Stook and West.*

**Objectives:** To provide students with a sound theoretical back ground in chemical principles that is essential to practice chemical analysis. It enables students to understand the importance of judging the accuracy and precision of experimental data and techniques of quantitative analysis, and also to show that theory frequently serves as a useful guide to the solution of analytical problems.

No	Lecture title	hours
1	Review of elementary concept important to analytical chemistry: Strong and weak electrolytes; important weight and concentration units.	4
2	The evaluation of analytical data: Definition of terms.	1
3	An introduction to gravimetric analysis: Statistical analysis of data; rejection of data; precipitation methods; gravimetric factor.	9
4	The scope of applications of gravimetric analysis: Inorganic precipitating agents; organic precipitating agents.	4
5	An introduction to volumetric methods of analysis: Volumetric calculations; acid-base equilibria and pH calculations.	5
6	Buffer solutions: Theory of neutralization titrations of simple system.	3
7	Theory of neutralization titrations of complex system; Precipitation titrations.	5
8	Calculation of pH in complex system; Volumetric methods based on complex system.	4
9	Equilibria in oxidation-reduction system; theory of oxidation-reduction titrations.	6
10	Spectrophotometric analysis: An introduction to optical methods of analysis; Methods based on absorption of radiation.	4

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

Title of the course: ***Human Biology*** Course number: 111

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

Credit hours/week : 2            Laboratory: 1

**Objectives:** Study the human body composition, types of cell structures, types of tissues, bone, skeleton, joints and muscle as well as the nutrition. Human biology also explains in details the different body systems and human genetics. At the end of the course the student should be able to describe the human body composition, body systems structure and function, and human genetics such as the mendelain inheritance, division of chromosomes, and terms such as allele, locus homo and heterozygous.

**Reference text: *Johnks and Englis (eds.), Text Book of Human Biology, . latest edition***

No	Lecture title
1	Biology
2	Cell
3	Tissues, bone and cartilages
4	Nervous system (central & peripheral)
5	Nutrition
6	Digestive system (Mouth, Esophagus, Stomach)
7	Digestive system (intestine)
8	Excretory system & respiration
9	Human genetics (chromosomes & semi-lethal genes)
10	Skin
11	Circulatory system
12	Immunity (Inflammation, immunity & the blood , immunity to disease)



hours
2
2
3
4
2
2
1
3
3
2
3
3



**University of Alayen**

**College of Pharmacy**

**Department of Clinical Laboratory Sciences**

Title of the course: *Computer Sciences* Course number: **114**

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

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

Reference text: *Pat Coleman and Peter Dyson, Mastering Internet Windows, 29<sup>th</sup> ed., Sybex, 1997.* and *Romanoff M (Ed), Microsoft 2000 complete, Sybex, 2000 .*

**Objectives:** Gives students the ability to deal with the concept of computer science, emphasizes the knowledge and skill required to efficiently discharge the duties and responsibilities of the pharmacist. The course deals with the concept of basic computer and application of it in human life and medical field. Upon completion of the course students will be able to understand the computer terminology and abbreviations used to describe the lecture, and the application programming languages.

No	Lecture title	hours
1	General concept: Information technology (IT); Computer systems (hardware, software, user); types of computers; major parts of the computer	3
2	Hardware: Hardware; input and output devices; central processing unit (CPU).	4
3	Memory, storage media and performance: Memory; kind of memory (RAM, ROM, cache memory, flash memory); data representation in memory; storage devices (secondary storage); kind of storage devices; computer performance.	6
4	Computer software: Software (system software, application software); programming languages; generation of programming languages (machine language, assembly language, high level language, application generators, objective oriented language); compiler and interpreters; operating systems (O.S ); function and type of O.S; type of software according to source; (commercial, shareware, freeware and public domain); interface, multimedia; system development.	6
5	Data Communication and network: Data communication; work group computing; type of networks; local area network (LAN); wide area network (WAN ); WAN Devices (HUB, router, get way, bridge, repeater); networks topologies; data communication hardware; protocols.	5

6	The internet: Internet development; using the internet; internet services; search engines; electronic mail; general concept of internet; viruses and type of virus; protection from virus; security system and information security; data protection act; computer crimes.	6
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**University of Alayen**

**College of Pharmacy**

**Department of Clinical Laboratory Sciences**

Title of the course: *Mathematics and Biostatistics* Course number: **115**

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

Credit hours/week: **Theory 3**

Reference text: *1. Finny RI, Thomas GB (Eds.); Calculus and Analytical Geometry.*

*2. Daniel WW (ED.), Foundation for Analysis in the Health Science, 4<sup>th</sup> ed.,*

**Objectives:** Gives students the ability to deal with the concept of Mathematics and Statistic, emphasizes the knowledge and skill required to efficiently discharge the duties and responsibilities of the pharmacist. The course deals with the concept of basic Mathematics and application of Biostatistics in the medical field. Upon completion of the course students will be able to understand the applications of statistics in medical field.

No	Lecture title	hours
1	Mathematics: General concepts; coordinate and graph in plane; inequality; absolute value or magnitude; function and their graphs; displacement function; slope and equation for lines.	6
2	Limits and continuity: Limits; theorem of limits; limit involving infinity; continuity; continuity conditions.	4
3	Derivatives: Line tangent and derivatives; differentiation rules; derivative of trigonometric function; practice exercises.	6
4	Integration: Indefinite integrals; rules for indefinite integrals; integration formulas for basic trigonometric function; definite integrals; properties of definite integrals; practice exercises.	6
5	Biostatistics: General concepts of statistics; statistical methods; statistical theory; applied statistics; statistical operations.	2
6	Probability concepts: Properties of probability; Set theory and set notation (basic notation); counting techniques- permutations and combinations; calculating the probability of an events; probability distribution of discrete variable; binomial distribution, Poisson distribution; continues probability distribution and normal distribution, review questions and exercises.	6



7	The concept of central tendency: Mean of sample and mean of population; median; mode; measure of central tendency; review questions and exercises.	6
8	Deviations and variation: Deviation; dispersion and variability; standard deviation and variance; coefficient of variations; standard error; correlation analysis.(regression model and sample regression equation); application of statistic in medical field; review questions and exercises.	9

**University of Alayen**

**College of Pharmacy**

**Department of Pharmaceutics**

Title of the course: *Principles of Pharmacy Practice* Course number: **112**

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

Credit hours/week : **Theory 2**

Reference text: *Pharmaceutical Calculation by Stoklosa*

**Objectives:** Involves brief information about old pharmacy. It teaches kinds of numbers, abbreviations that are commonly used in prescriptions and their meanings. In this course the students will understand the components of typical prescription, the different unit systems and the relation between these systems. Students will also be familiar with the methods and tools of measuring weights and volumes, and how to calculate doses on different bases and know how to reduce or enlarge formulas; they will be able to describe values in percentage and ratio strength.

<b>No</b>	<b>Lecture title</b>	<b>hours</b>
1	Some fundamentals of measurements and calculations.	4
2	Interpretation of prescription or medication orders.	4
3	The metric system.	4
4	Calculation of doses.	4
5	Reducing and enlarging formulas.	4
6	Density, specific gravity and specific volume.	4
7	Percentage and ratio strength calculation.	6

**University of Alayen**

**College of Pharmacy**

**Department of Pharmacology and Toxicology**

Title of the course: *Medical Terminology* Course number: **116**

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

Credit hours/week: **Theory 1**

Reference text: *Edward CC, (Ed.); A Short Course in Medical Terminology; 1st Ed.; Lippincott Williams and Wilkins; 2008.*

**Objective:** In this course, students will learn to pronounce, spell, and define medical and pharmaceutical terms used in health care settings. It will use a word-building strategy that helps them discover connections and relationships among word roots, prefixes, and suffixes. They will learn the meaning of each part of a complex medical and pharmaceutical term and be able to put the parts together

No	Lecture title	hours
1	Basic word roots and common suffixes	1
2	More word roots, suffixes and prefixes related to pharmaceutical sciences (pharmacognosy, clinical pharmacy, pharmaceuticals,...etc)	1
3	Basic anatomical terms and abnormal conditions	2
4	The genitals and urinary tract	1
5	The gastrointestinal tract	1
6	The heart and cardiovascular system	1
7	Symptoms, diagnoses, treatments, communication qualifiers, and statistics	2
8	Growth and development, and body orientation	1
9	Gynecology, pregnancy, and childbirth	1
10	The eye and the respiratory tract	1
11	The nervous system and behavioral disorders	2
12	Blood and immunity	1

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

Title of the course: *Human Anatomy* Course number: 127

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

Credit hours/week: Theory 1 lab1

Study the position of different organs in the thoracic and abdominal cavity including: digestive system, circulatory system, lymphatic system, respiratory system, urinary system, reproductive system, endocrine system, nervous system and skin

Reference text:

*1- Clinical Anatomy by Regions (Richard S. Snell 8<sup>th</sup> ed. 2010).*

<i>Lecture No.</i>	<i>Subjective</i>
1	<b>Circulatory system:</b> Location of vascular system (Heart, Arteries, Veins)
2	<b>Circulatory system:</b> Location of lymphatic system (Lymphatic capillary).
3	<b>Lymphoid tissue:</b> location of the (Thymus gland, Spleen & Lymph nodes)
4	Lymphoid nodule (MALT) & Tonsils
5	<b>Nervous system:</b> Central & Peripheral nervous system by location
6	<b>Respiratory system:</b> -Conducting portion (Nose, Nasopharynx, Trachea Bronchus & Bronchioles). -Respiratory portion (Lung)
7	<b>Digestive system:</b> -location of different parts of digestive tract (GIT) (Oral cavity, Mouth, Esophagus & Stomach) -Small intestine, Large intestine, Rectum & Anus.
8	<b>Digestive system:</b>

	Glands associated with the digestive tract by location (Salivary glands, Pancreas, Liver & Gall bladder).
9	<b>Endocrine system:</b> -location of the pituitary gland -location of the Adrenal, Thyroid, Parathyroid, Islet of Langerhans & Pineal glands.
10	<b>Male reproductive system:</b> -location of the testes. -Excretory genital ducts -Excretory genital glands (Seminal vesicles, Prostate & Cowper's glands)
11	<b>Female reproductive system:</b> -location of ovary, Oviduct, Uterus & Vagina.
12	<b>Urinary system:</b> -location of the (kidney & nephron) - location of the (Ureter, Bladder & Urethra).

<i>No. of Hours</i>
1
1
1
1
1
1
2
1

1
2
2
1

**University of Alayen**

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Title of the course: *Medical Physics* Course number: **129**

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

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

Reference text: *Physics for Biology and Medical Students, 2<sup>nd</sup> ed.*

**Objectives:** Gives students the ability to deal with the concepts of physics, emphasizes the knowledge and skills required to efficiently discharge the duties and responsibilities of the pharmacist. The course deals with the concept of basic physics and application of physics in the medical field. Upon completion of the course the students will be able to understand the physical terminology and abbreviation used to describe the lecture, and the application in medical field.

No	Lecture title	hours
1	General concepts: Method of physics and standards; thermodynamics system and system properties; conservation of energy principle; application of thermodynamics; the Zeroth law.	3
2	Pressure; temperature and temperature scales (Celsius, Fahrenheit, Kelvin); equation of state; ideal gas and real gas; general law of gases; clauses equation and Vander Waales equation; equilibrium and types of equilibrium; compressibility factor, coefficient of volume expansion, elastic coefficient (bulk modulus).	6
3	Heat and energy; work and mechanical forms of work; power; the 1 <sup>st</sup> law of thermodynamics; Boyles and Charles law; practice exercises.	3
4	The 2 <sup>nd</sup> law of thermodynamics; reversible and irreversible process; entropy and enthalpy; internal energy; heat capacity and adiabatic process; the relation between pressure, volume, and temperature in adiabatic process.	6
5	Fundamental of physics: Kinetic theory of a gas; electromagnetic waves; Maxwell equations; physical optics.	6
6	Radiation: Kirshoffs law; planks law; Stefan-Boltzman law; Wiens law; Black body and Albedo; Heat transfer (radiation, convection, conduction).	6



7	Production of X-Ray and X-Ray spectra; absorption of X-Ray; U.V and IR effects; medical and biological effects of radiation; radiotherapy.	3
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**University of Alayen**

**College of Pharmacy**

**Department of Pharmaceutical Chemistry**

Title of the course: *Organic Chemistry I* Course number: **1210**

Level: 1<sup>st</sup> Class, 2<sup>nd</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 alkanes, alkenes and alkynes, in addition to the principles of stereochemistry and features of aromatic compounds.

<b>No</b>	<b>Lecture title</b>	<b>hours</b>
1	Introduction.	3
2	Alkanes and methane.	6
3	Alkenes I and II	5
4	Alkynes and dienes.	5
5	Stereochemistry I & II	8
6	Alcohols and ethers.	8
7	Alkyl halides.	6
8	Cycloalkanes.	4

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

Title of the course: *Pharmaceutical Calculation* Course number:

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

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

Reference text: *Pharmaceutical Calculations by Stoklosa*

**Objectives:** It involves computation of pharmaceutical ingredients, dosage forms, pharmaceutical formulations of extemporaneous compounding, and biological parameters of drug substances. The course teaches calculations for dilution and concentration of different types of liquids and those involved in preparing isotonic solutions, electrolyte solutions and intravenous admixtures.

No	Lecture title	hours
1	Dilution and concentration of pharmaceutical preparations.	10
2	Isotonic solutions.	6
3	Electrolyte solutions (milliequivalents, millimoles and milliosmoles).	6
4	Constituted solutions, I.V admixtures and flow rate calculations.	8

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

Title of the course: ***Histology*** Course number: 127

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

Credit hours/week : 2      Laboratory:1

**Objectives:** To study the histological structure of the human body. It is meant primarily to give the student a foundation for advanced study in health care, physiology, pathology, and other fields related to health and fitness. At the end of the course the student should be familiar with the histological description of the human body

**Reference text:**

***1- Basic Histology by Luiz Carlos 11<sup>th</sup> ed. (2005)***

<b><i>Lecture No.</i></b>	<b><i>Subjective</i></b>	<b><i>No. of Hours</i></b>
1	<b>Circulatory system:</b> Structure of the vascular system (Heart wall, Arteries, Veins & Capillaries)	2
2	<b>Circulatory system:</b> Structure of the lymphatic system (Lymphatic	1
3	<b>Lymphoid tissue:</b> Structure & function of the (Thymus gland, Spleen & Lymph nodes)	1
4	Lymphoid nodule (MALT) & Tonsils	1
5	<b>Nervous system:</b> Central & Peripheral nervous system	3
6	<b>Respiratory system:</b> -Conducting portion (Nose, Nasopharynx, Trachea Bronchus & Bronchioles). -Respiratory portion (Lung)	3
7	<b>Digestive system:</b> -Digestive steps. -General structure of the digestive tract (GIT) (Oral cavity, Mouth, Esophagus & Stomach)	3

	-Small intestine, Large intestine, Rectum & Anus.	
8	<b>Digestive system:</b> Glands associated with the digestive tract (Salivary glands, Pancreas, Liver & Gall bladder).	1
9	<b>Endocrine system:</b> -General structure of the pituitary gland -Histophysiology of the pituitary gland.	2
10	<b>Endocrine system:</b> -General structure of the Adrenal, Thyroid, Parathyroid, Islet of Langerhans & Pineal glands.	2
11	<b>Male reproductive system:</b> -General structure of the testes. -Stages of spermatogenesis.	2
12	<b>Male reproductive system:</b> -Excretory genital ducts-Excretory genital glands (Seminal vesicles, Prostate & Cowper's glands)	1
13	<b>Female reproductive system:</b> -General structure of ovary, Oviduct, Uterus & Vagina. -Stages of follicle development. -Ovulation	3
14	<b>Urinary system:</b> -Structure & Function of the (kidney & nephron) -Histology of the nephron (filtration, absorption & excretion). - Structure of the (Ureter, Bladder & Urethra).	3
15	<b>The skin</b> Thick & Thin skin	2

**University of Alayen**

**College of Pharmacy**

Title of the course: *Human right univ.code*

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

Credit hours/week : 1