college of pharmacy

**UNIVERSITY OF DUHOK**

****

**Academic Syllabus 2019-2020**

About the college of pharmacy

* **It was established in 2009.**
* **The hierarchy of teaching staff :**

1. The Dean.
2. The Deputy Dean, administration affairs.
3. The Departments :
4. Clinical Pharmacy.
5. Pharmacology.
6. Medicinal chemistry.
7. Pharmaceutics.

* **The education program :**

|  |  |
| --- | --- |
| Certificate degree | Years |
| B.Sc. Pharmacy | Five years. |
| M.Sc. Program | One year courses and one year thesis. |
| Ph.D. Program | One year courses and two years thesis. |

* **The education program staff :**

|  |  |  |
| --- | --- | --- |
| Certificate degree students | Number | Location |
| Doctoral degree | 5 | IRAQ, UK, FINLAND, and TURKY. |
| Master degree | 2 | IRAQ. |

Study requirements

First year

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **First Year - First semester 2018 - 2019** | | | | |
|
| **Subjects** | Theory hour | Practical hour | Units | |
| Analytical chemistry | 3 | 2 | 4 | |
| Human biology | 3 | 3 | 4 | |
| Biostatistics and Mathematics | 2 | 0 | 2 | |
| Biophysics | 2 | 2 | 3 | |
| Kurdology | 2 | 0 | 2 | |
| Information Technology (IT) | 0 | 3 | 1 | |
| English language | 1 | 0 | 1 | |
| Academic debate | 0 | 3 | 1 | |
| Total |  |  | **18** | |
| **First Year - Second semester 2018 - 2019** | | | |
|
| **Subjects** | Theory hour | Practical hour | Units |
| Organic chemistry I | 3 | 3 | 4 |
| Histology | 2 | 3 | 3 |
| Principle of pharmacy (Practice & Calculation) | 3 | 3 | 4 |
| English | 1 | 1 | 1 |
| Academic debate | 0 | 3 | 1 |
| Kurdology | 2 | 0 | 2 |
| Genetics | 2 | 0 | 2 |
| Information Technology (IT) | 0 | 3 | 1 |
| Medical terminology | 1 | 0 | 1 |
| Total |  |  | **19** |

Study requirements

# Second year

|  |  |  |  |
| --- | --- | --- | --- |
| **Second Year - First semester 2018 - 2019** | | | |
|
| **Subjects** | Theory hour | Practical hour | Units |
| Pharmaceutical Organic chemistry II | 3 | 3 | 4 |
| Human Anatomy | 3 | 3 | 4 |
| Medical Microbiology (Bacteriology) | 3 | 3 | 4 |
| Introduction to Pharmaceutical Sc. (Physical pharmacy) | 2 | 0 | 2 |
| Human physiology I | 2 | 3 | 3 |
| Pharmacoeconomics | 2 | 0 | 2 |
| Total |  |  | **19** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Second Year - Second semester 2018 - 2019** | | | |
|
| **Subjects** | Theory hour | Practical hour | Units |
| Pharmaceutical Organic chemistry III | 3 | 3 | 4 |
| Accounting | 1 | 0 | 1 |
| Human physiology II | 3 | 3 | 4 |
| Medical Microbiology (Parasitology) | 2 | 3 | 3 |
| Immunology | 2 | 0 | 2 |
| Physical pharmacy II | 3 | 3 | 4 |
| Total |  |  | **18** |

Study requirements

# Third year

|  |  |  |  |
| --- | --- | --- | --- |
| **Third Year - First Semester 2018 - 2019** | | | |
|
| **Subjects** | Theory hours | Practical hours | Units |
| Biochemistry I | 3 | 3 | 4 |
| Pharmacognosy I | 2 | 2 | 3 |
| Pharmacology I | 3 | 0 | 3 |
| Pharmaceutical medicinal chemistry I | 2 | 0 | 2 |
| Pharmaceutical compounding and technology | 3 | 3 | 4 |
| Pathology | 2 | 2 | 3 |
| Total |  |  | **19** |
|  |  |  |  |
|  |  |  |  |
| **Third Year - Second Semester 2018 - 2019** | | | |
|
| **Subjects** | Theory hour | Practical hour | Units |
| Biochemistry II | 2 | 0 | 2 |
| Pharmacognosy II | 2 | 2 | 3 |
| Pharmacology II | 2 | 2 | 3 |
| Pharmaceutical medicinal chemistry II | 2 | 0 | 2 |
| Pharmaceutical compounding and technology | 3 | 3 | 4 |
| Pathophysiology | 2 | 0 | 2 |
| Drug informatics | 0 | 2 | 1 |
| Pharmacy practice experience | 0 | 2 | 1 |
| Total |  |  | **18** |

Study requirements

# Fourth year

|  |  |  |  |
| --- | --- | --- | --- |
| **Fourth Year - First Semester 2018 - 2019** | | | |
|
| **Subjects** | Theory hours | Practical hours | Units |
| Biopharmaceutics | 2 | 0 | 2 |
| Pharmacology III | 3 | 2 | 4 |
| Pharmaceutical medicinal chemistry III | 2 | 2 | 3 |
| Therapeutics I (Respiratory + GIT + Neurological disorder) | 3 | 0 | 3 |
| Pharmacy practices II | 0 | 2 | 1 |
| Public health and First aid | 2 | 0 | 2 |
| Patient assessment and communication | 2 | 2 | 3 |
| Total |  |  | **18** |
|  |  |  |  |
| **Fourth Year - Second Semester 2018 - 2019** | | | |
|
| **Subjects** | Theory hour | Practical hour | Units |
| Pharmacokinetics | 2 | 3 | 3 |
| Toxicology | 2 | 3 | 3 |
| Pharmaceutical medicinal chemistry IV | 2 | 0 | 2 |
| Therapeutics II (Cardiovascular + Hematology + Oncology). | 4 | 0 | 4 |
| Pharmacy practices III | 0 | 3 | 1 |
| Pharmacy management and administration | 2 | 0 | 2 |
| Community pharmacy + Law and Ethics | 2 | 0 | 2 |
| Total |  |  | **18** |

Study requirements

# Fifth year

|  |  |  |  |
| --- | --- | --- | --- |
| **Fifth Year - First Semester 2018 - 2019** | | | |
|
| **Subjects** | Theory hours | Practical hours | Units |
| Industrial Pharmacy I | 3 | 3 | 4 |
| Clinical Toxiclogy | 2 | 2 | 3 |
| Clinical Biochemistry | 3 | 2 | 4 |
| Therapeutics III (Endocrine + Renal +Infection disease) | 3 | 0 | 3 |
| Clinical pharmacy ( Case study) | 0 | 2 | 1 |
| Graduation research project | 0 | 2 | 1 |
| Total |  |  | **16** |
|  |  |  |  |
| **Fifth Year - Second Semester 2018 - 2019** | | | |
|
| **Subjects** | Theory hours | Practical hours | Units |
| Industrial Pharmacy II | 3 | 3 | 4 |
| Clinical pharmacokinetics | 2 | 0 | 2 |
| Pharmaceutical instrumental analysis | 2 | 2 | 3 |
| Hospital Training (wards) | 1 | 1 | 2 |
| Hospital training (Clinical lab) | 1 | 1 | 2 |
| Cosmetics | 1 | 0 | 1 |
| Pro-drugs | 2 | 0 | 2 |
| Total |  |  | **16** |

Syllabus

FIRST YEAR

### **First semester**

1. ***ANALYTICAL CHEMISTRY***

|  |  |
| --- | --- |
| **Time (in hours) per week** | **Theory: 3** |
| **Lecturers** | **Dr. Intisar Khalid Mohammed.** |

**Theoretical Topics**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course** | **Subjects** | **Hours** | **Lecturer** |
| **Analytical chemistry** | Theoretical Analytical Chemistry Quantitative Analysis Volumetric | **1** | **Dr. Intisar Khalid Mohammed** |
| Principles of Volumetric Analysis | **2** | **Dr. Intisar Khalid Mohammed** |
| General Principle |  |  |
| Titration |  |  |
| The requirements of a titration |  |  |
| Standard solutions |  |  |
| Secondary standard solution |  |  |
| Standardization | **3** | **Dr. Intisar Khalid Mohammed** |
| Equivalence point |  |  |
| End points in volumetric methods |  |  |
| Titer |  |  |
| Titration error |  |  |
| The requirements of a primary standard substances |  |  |
|  | Classification of volumetric methods |  |  |
|  | 1- Acid- base method |  |  |
|  | 2- Precipitation method |  |  |
|  | 3- Complexometric method | **3** | **Dr. Intisar Khalid Mohammed** |
|  | 4- Oxidation- reduction method |  |  |
|  | Modes of titrations |  |  |
|  | 1-       Direct titration |  |  |
|  | 2-       Back titrations |  |  |
|  | 3-       Indirect titration |  |  |
|  | Acid –base titrations for simple systems |  |  |
|  | Theory of indicator behavior |  |  |
|  | Theory of acid – base indicators | **3** | **Dr. Intisar Khalid Mohammed** |
|  | 1-       Ostwald-ionic theory |  |  |
|  | 2-       Chromophore theory |  |  |
|  | 3-       Ionic chromophore theory |  |  |
|  | Titration curves for simple Neutralization reactions |  |  |
|  | Oxidation-reduction Indicator, 1- Specific indicators, 2- True oxidation-reduction indicators |  |  |
|  | Methods of balancing redox reaction1- Oxidation number method2- The ion-electron method |  |  |
|  | Problems | **3** | **Dr. Intisar Khalid Mohammed** |
|  | Application of oxidation-reduction titrations |  |  |
|  | Some important oxidizing & reducing agents . Iodine |  |  |
|  | Titration of solution of strong acids and bases Titration curves |  |  |
|  | 2- Titration of solutions of strong base and weak acid (Examples) |  |  |
|  | Precipitation Titrations |  |  |
|  | Titration curves for precipitation reactions |  |  |
|  | Mohr method |  |  |
|  | Volhard method |  |  |
|  | Fajan method | **3** | **Dr. Intisar Khalid Mohammed** |
|  | Liebige method |  |  |
|  | Complexometric Titrations |  |  |
|  | General discussion |  |  |
|  | Titration curves for complex- formation reaction |  |  |
|  | Complexometric titration with AminoPolycarboxylic acid |  |  |
|  | Properties of EDTA |  |  |
|  | EDTA dissociation |  |  |
|  | Titration curves |  |  |
|  | Example |  |  |
|  | End point of EDTA titrations | **3** | **Dr. Intisar Khalid Mohammed** |
|  | Mechanism of EBT indicator |  |  |
|  | Appplication of Complexometric titration |  |  |
|  | Hardness of water |  |  |
|  | Electrochemistry |  |  |
|  | Introduction |  |  |
|  | Oxidizing agent |  |  |
|  | Reducing agent |  |  |
|  | Electrochemical cells | **3** | **Dr. Intisar Khalid Mohammed** |
|  | Nernest equation |  |  |
|  | Examples |  |  |
|  | The relationship between constant electrode potential |  |  |
|  | Theory of oxidation-reduction titrations |  |  |
|  | Titration curves |  |  |
|  | Oxidation-reduction Indicators, 1- Specific indicators, 2- True oxidation-reduction indicators. |  |  |
|  | Direct or iodimetric processes |  |  |
|  | Indirect or Iodometric processes |  |  |
|  | In redox titrations |  |  |
|  | Potassium Permanganate |  |  |
|  | Sodium Oxalate | **3** | **Dr. Intisar Khalid Mohammed** |
|  | Iron :Fe |  |  |
|  | Potassium dichromate |  |  |
|  | Cerium (IV) Compounds |  |  |
|  | Iodine |  |  |
|  | Direct or iodimetric processes |  |  |
|  | Indirect or Iodometric processes |  |  |
|  | Sodium thiosulfate |  |  |

**Practical Topics**

|  |  |
| --- | --- |
| **Time (in hours) per week** | **Practical: 4** |
| **Lecturers** | **Dr. Intisar Khalid Mohammed.** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Course** | **Subjects** | **Hours** | **Lecturer** |
| **Analytical chemistry (Practical)** | Introduction to the environmental laboratory | **1** | **Dr. Intisar Khalid Mohammed** |
| A. Laboratory safety , general rules . B. Glassware and related equipment . C. Laboratory reagents . | **1** | **Dr. Intisar Khalid Mohammed** |
| Calculations : Concentration Calculations (normality ,, formality, molarity,, percentage , part per million ppm. , molality Dilutions :…….. etc. ). |  |  |
| **Applications of Acid-base titrations------------Neutralization titrations** |  |  |
| **Experiment no. 1- Preparation and standardization of acid- base solutions(HCl)** |  |  |
| **Experiment no. 2- Preparation and standardization of base solution (NaOH)** | **4** | **Dr. Intisar Khalid Mohammed** |
| **Experiment no. 3- Determination of Acetic acid** |  |  |
| **Determination of acetic acid in Vinegar** |  |  |
| **Experiment no. 4- Determination of a mixture of Sodium hydroxide and Sodium Carbonate** |  |  |
|  |  |  |
| **Application.**  **Analysis of Stomach Antacid Tablets** |  |  |
| **Precipitation titrations . xperiment no. 5- Determination of Chloride by Mohr method** | **4** | **Dr. Intisar Khalid Mohammed** |
| **Experiment no. 6- Determination of iodide by Volhard method Procedure.** |  |  |
|  |  |  |
|  |  |  |
| **Complexometric titrations .**  **Experiment no. 7-Determination of water hardness.** |  |  |
| **Electrochemistry . Experiment no. 8- Determination of ferrous by oxidation- reduction titration.** |  |  |
| **Determination of available chlorine in a bleaching solution.** | **4** | **Dr. Intisar Khalid Mohammed** |
| **Spectrophotometric determination . Experiment no. 9- Spectrophotometric determination of aspirin tablet .** |  |  |
|  |  |  |
|  |  |  |

### ***2. Human Biology:***

|  |  |
| --- | --- |
| **Time (in hours) per week** | **Theory: 3** |
| **Lecturers** | **Dr. Sami Reshag Laibi Al-Zubaydi**  **Asst. Lec. Ghazwan Ahmed Mohammed Raouf** |

**Theoretical Topics**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course** | **Subjects** | **Hours** | **Lecturer** |
| **Human Biology** | Definitions and Introduction to human biology | **2** | Dr. Sami Reshag Laibi AL-Zubaydi |
| Classification and Characteristics of humans | **2** | Dr. Sami Reshag Laibi AL-Zubaydi |
| Nutrition in human ( Water – Carbohydrate - Lipid- Protein - Mineral and trace elements needed for Human health - Vitamins needed in the human diet- Fibers) | **2** | Dr. Sami Reshag Laibi AL-Zubaydi |
| Cells - Prokaryotic cell - Eukaryotic cell. Cells and Organelles (Living and non- living organelles) | **2** | Ghazwan Ahmed Mohammed |
| The four primary Tissues: 1) Epithelium: Classification of Epithelia Membranes ( Simple and Stratified Epithelia) Cell Adhesion in epithelial membranes. Specializations of the cell surface in Epithelia | **2** | Ghazwan Ahmed Mohammed |
| Glandular Epithelium Classification of Glands, Types & Mode of Secretion | **2** | Ghazwan Ahmed Mohammed |
| Connective Tissue: Cells; Fibers; and Ground substance | **2** | Ghazwan Ahmed Mohammed |
| Classification of Connective Tissues  ( Loose; Dense and Special Connective Tissues) | **2** | Ghazwan Ahmed Mohammed;ou |
| Specialized Connective Tissues. Cartilage ( Hyaline; Elastic and Fibro cartilage). | **2** | Ghazwan Ahmed Mohammed |
| Bone  1) Bone cells and Matrix 2) Periosteum&Endosteum  3) Types of Bone 4) Bone Formation 5) The Joints | **2** | Ghazwan Ahmed Mohammed |
| Blood (Erythrocytes; Leukocytes; Blood Platelets; Plasma and  Lymph).Hemopoiesis | **2** | Ghazwan Ahmed Mohammed |
| Nervous Tissue 1) Neuron; Synapses; Neuroglial; Types of Neurons; Nerve   fibers; Peripheral Nerves) 2) Cerebellar & Cerebral Hemispheres 3) Spinal Cord | **2** | Dr. Sami Reshag Laibi AL-Zubaydi |
| Human genetics   Mendel's laws- Dominant Traits -Recessive traits-   Incomplete dominance- Co- dominance- Sex determination- Linkages- Linkage's limited- Sex influence - Lethality - Chromosomal disorder. | **2** | Dr. Sami Reshag Laibi AL-Zubaydi |
|  | Structure & function of genes-Mutation, Genetic engineering | **2** | Dr. Sami Reshag Laibi AL-Zubaydi |

**Practical Topics**

|  |  |
| --- | --- |
| **Time (in hours) per week** | **Practical: 4** |
| **Lecturers** | **Asst. Lec. GHAZWAN AHMED MOHAMMED RAOUF** |

|  |  |  |  |
| --- | --- | --- | --- |
| Human Biology- Practical | Title of the Subject | Hours | Lecturer |
| Orientation  - Instruction and General information  - Microscopy-  The Light Microscope (Parts & Use) | **4** | Ghazwan Ahmed Mohammed |
| Cell   * Prokaryotic cell * Eukaryotic cell   Cell components & shapes | **4** | Ghazwan Ahmed Mohammed |
| - Cells Cell division: Mitosis & Meiosis  - Chromosomes (karyotyp) | **4** | Ghazwan Ahmed Mohammed |
| The primitive Tissues:   1. Epithelium   Simple Epithelial Tissues | **4** | Ghazwan Ahmed Mohammed |
| The primitive Tissues:  b) Stratified Epithelial Tissues | **2** | Ghazwan Ahmed Mohammed |
| c)Glandular Epithelial tissue | **2** | Ghazwan Ahmed Mohammed |
|  | 3) Connective Tissue ( Loose and Dense Connective  Tissues) | **2** | Ghazwan Ahmed Mohammed |
| Specialized Connective Tissues A) Cartilage ( Hyaline; Elastic and Fibro cartilage)  B) Bone | **2** | Ghazwan Ahmed Mohammed |
| C) Blood | **2** | Ghazwan Ahmed Mohammed |
| Muscular Tissues *(Skeletal; Car*diac and Smooth Muscle) | **2** | Ghazwan Ahmed Mohammed |
| Nervous system | **4** | Ghazwan Ahmed Mohammed |
| Using mouse as a model to study the distribution of the o rgans in the body. |
| Revision for previous practical subject | **4** | Ghazwan Ahmed Mohammed |

### ***Biostatistics and mathematics:***

|  |  |
| --- | --- |
| **Time (in hours) per week** | **Theory: 2** |
| **Lecturers** | **Dr. Ibtesam Salih Abdulrahman** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Course** | **Subjects** | **Hours** | **Lecturer** |
| **Biostatistics** |  |  |  |
| Biostatistics:Introduction ,definitions | **2** | Dr. Ibtesam Salih Abdulrahman |
| Sampling | **1** | Dr. Ibtesam Salih Abdulrahman |
| Tablar data Presentation of data | **1** | Dr. Ibtesam Salih Abdulrahman |
| Graphical data presentation | **1** | Dr. Ibtesam Salih Abdulrahman |
| Measures of central tendency | **1** | Dr. Ibtesam Salih Abdulrahman |
| Measures of dispersion | **1** | Dr. Ibtesam Salih Abdulrahman |
| Measure of Shape | **1** | Dr. Ibtesam Salih Abdulrahman |
| Grouped data | **1** | Dr. Ibtesam Salih Abdulrahman |
| Contingency table | **1** | Dr. Ibtesam Salih Abdulrahman |
| Practical examples on application of biostatics | **2** | Dr. Ibtesam Salih Abdulrahman |
| Qi squre test , T test, Z test | **2** | Dr. Ibtesam Salih Abdulrahman |
| Measures of disease frequency | **1** | Dr. Ibtesam Salih Abdulrahman |
| measures of morbidity | **1** | Dr. Ibtesam Salih Abdulrahman |
| measures of mortality | **1** | Dr. Ibtesam Salih Abdulrahman |
| Probability | **1** | Dr. Ibtesam Salih Abdulrahman |

### ***4- biophysics*:**

|  |  |
| --- | --- |
| **Time (in hours) per week** | **Theory: 2** |
| **Lecturers** | **Mrs. Haliz Adbulrahman Husain** |

**Theoretical Topics**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course** | **Subjects** | **Hours** | **Lecturer** |
| **Biophysics** | State of Matter | **2** | Mrs. Haliz |
| Heat & Temperature | **2** | Mrs. Haliz |
| *Heat Transfer Methods* | **2** | Mrs. Haliz |
| Kinetic Theory of Gas | **2** | Mrs. Haliz |
| Entropy | **2** | Mrs. Haliz |
| Specific Heat Capacity | **2** | Mrs. Haliz |
| Midterm exam | **2** | Mrs. Haliz |
| Liquid Properties Diffusion & Osmosis | **2** | Mrs. Haliz |
| *Midterm Exam* | **2** | Mrs. Haliz |
| Fluids | **2** | Mrs. Haliz |
| Gas + Liquid | **2** | Mrs. Haliz |
| Blood Pressure Analysis | **2** | Mrs. Haliz |
| Viscosity | **2** | Mrs. Haliz |
|  | X-ray*.* | **2** | Mrs. Haliz |

**Practical Topics**

|  |  |
| --- | --- |
| **Time (in hours) per week** | **Practical: 2** |
| **Lecturers** | **Mrs. Haliz** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Course** | **Subjects** | **Hours** | **Lecturer** |
| **Biophysics Practical** | Measurements of length; Vernier scales and Micrometer screws | **2** | Mrs. Haliz |
| Units and Measurements | **2** | Mrs. Haliz |
| Random Error & Error analysis | **2** | Mrs. Haliz |
| Ohm's Law and Human Resistance | **2** | Mrs. Haliz |
| Changing States of Matter | **2** | Mrs. Haliz |
| Blood Pressure and its measurementby using Bernoulli’s principle | **2** | Mrs. Haliz |
| Temperature Measurements | **2** | Mrs. Haliz |
| Human Eye as a Lens | **2** | Mrs. Haliz |
| Artificial Pacemakers tostudy the charging and discharging capacitor through resistor | **2** | Mrs. Haliz |
| Electroencephalogram (EEG) | **2** | Mrs. Haliz |
| DC Shock(Capacitive Discharge Defibrillator) | **2** | Mrs. Haliz |
| Demonstration in (department of radiology). | **2** | Mrs. Haliz |
| Electrocardiogram **)**ECG**(**(to study the process of the electrical activity of the heart over a period of time) | **2** | Mrs. Haliz |

### ***Kurdology:***

### ***Information Technology (IT)***

### ***English language***

### ***Academic Debate:***

|  |  |
| --- | --- |
| **Time (in hours) per week** | Theory: 2 |
| **Lecturers** | **Dr. Sami Reshag Laibi Al-Zubaydi**  **Mr. Nashwan Younis Mustafa** |

**Theoretical Topics**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course** | **Subjects** | **Hours** | **Lecturer** |
| **Academic Dabate** |  |  |  |
| Debate theory, Seminars and Presentation. | **2** | **Dr. Sami Reshag Laibi Al-Zubaydi** |
| Oral presentation skills. | **2** | **Dr. Sami Reshag Laibi Al-Zubaydi** |
| Class discussion. | **2** | **Dr. Sami Reshag Laibi Al-Zubaydi** |
| Slide presentation and presentation. | **2** | **Dr. Sami Reshag Laibi Al-Zubaydi** |
| Power point presentation. | **2** | **Dr. Sami Reshag Laibi Al-Zubaydi** |
| How to construct an argument. | **2** | **Dr. Sami Reshag Laibi Al-Zubaydi** |
| Speaking and listening. | **2** | **Dr. Sami Reshag Laibi Al-Zubaydi** |
| Ethics of communication. | **2** | **Dr. Sami Reshag Laibi Al-Zubaydi** |
| Philosophy of science and generation of knowledge. | **2** | **Mr. Nashwan Younis Mustafa** |
| Note taking. | **2** | **Mr. Nashwan Younis Mustafa** |
| Effective poster presentation. | **2** | **Mr. Nashwan Younis Mustafa** |
| Speed reading. | **2** | **Mr. Nashwan Younis Mustafa** |
| How to write a proposal. | **2** | **Mr. Nashwan Younis Mustafa** |
| Essay and report writing skills. | **2** | **Mr. Nashwan Younis Mustafa** |
| Reference management (Endnote) | **2** | **Mr. Nashwan Younis Mustafa** |

**Practical Topics: None**

### **Second semester**

### *Organic chemistry I*

|  |  |  |  |
| --- | --- | --- | --- |
| Organic Chemistry I \First & second courses.  (Hours per week) | Theory | Practical | Total |
| 3 | 3 | 6 |
| **Lecturers** | **Dr. Pemanos Yalda Bakoz** | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Organic Chemistry I** | Subject | Hour | Lecturers |
| Definition of organic chemistry , structural features of organic compounds , structure and bonding , chemical bonds , hybridization and the valency of carbon , electronegativity and bond polarity , polarity of a molecule . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Definition of hydrocarbons , types of H.C , definition of alkanes , nomenclature of alkanes , physical properties of alkanes , industrial and laboratory preparation of alkanes . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Reaction of alkanes , radical substitution reactions and their mechanism Alkenes : definition , nomenclature, isomerism ( cis - , trans - , E and Z configurations ) , physical properties of alkenes . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Laboratory preparation of alkenes , E1 and E2 mechanisms , dehydration of alcohols . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Reactions of alkenes , electrophilic addition reactions and their mechanisms , theoretical basis for Markovnikov rule . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Oxidation of alkenes . Aliphatic cyclic hydrocarbons : nomenclature , preparation , reactions , heat of combustion . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Conformations of alicyclic H.C and factors affecting their stability , stereoisomerism of alicyclic H.C . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Alkynes : definition , nomenclature, physical properties , industrial and laboratory preparation . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Reactions of alkynes , electrophilic addition reactions , formation of heavy metal acetylide and alkali metal acetylide . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Dienes : types of dienes , properties and reactions of dienes , thermodynamically and kinetically controlled products , polymerization of dienes . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Alkyl halides : nomenclature , physical properties , and preparation . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Reaction of alkyl halides , nucleophile and nucleophilicity . Alcohols : nomenclature , physical properties , industrial source . | **3** | **Dr. Pemanos Yalda Bakoz** |
|  | Preparation and reactions of alcohols . | **3** | **Dr. Pemanos Yalda Bakoz** |

### *histology:*

### *Principle of pharmacy (practice and calculation)*

### *English*

### *Academic debate*

### *kurdology*

### *Genetics*

### *information Technology (IT)*

### *Medical terminology.*

second year

### first semester

### *Pharmaceutical organic chemistry II:*

|  |  |  |  |
| --- | --- | --- | --- |
| Organic Chemistry I I \First courses.  (Hours per week) | Theory | Practical | Total |
| 3 | 3 | 6 |
| **Lecturers** | **Dr. Pemanos Yalda Bakoz** | | |

**Theoretical Topics :**

|  |  |  |  |
| --- | --- | --- | --- |
| **Organic Chemistry II** | Ethers : nomenclature , physical properties , industrial source and preparation . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Aldehydes and ketones : nomenclature , physical properties , industrial source and preparation . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Reactions of aldehydes and ketones . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Aromaticity , structure of benzene , nomenclature of benzene derivatives , electrophilic aromatic substitution reactions and their mechanisms . | **3** | **Dr. Pemanos Yalda Bakoz** |
| Theories of reactivity and orientation in electrophilic aromatic substitution reactions .Arenes , nomenclature and preparations . | 3 | **Dr. Pemanos Yalda Bakoz** |
| Carboxylic acids :nomenclature , physical properties , industrial sourses and laboratory preparation . | 3 | **Dr. Pemanos Yalda Bakoz** |
| Reactions of carboxylic acids , effect of substituents on the acidity of both aliphatic and aromatic acids . | 3 | **Dr. Pemanos Yalda Bakoz** |
| Dicarboxylic acids and carboxylic acid derivatives . | 3 | **Dr. Pemanos Yalda Bakoz** |
| Amines : nomenclature, physical properties , laboratory preparation of amines . | 3 | **Dr. Pemanos Yalda Bakoz** |
| Basicity of both aliphatic and aromatic amines and the effect of substituents on the basicity . | 3 | **Dr. Pemanos Yalda Bakoz** |
| Chemical reactions of amines ,diazonium salts and their reactions , synthesis using diazonium salts . | 3 | **Dr. Pemanos Yalda Bakoz** |
| Ring substitution in aromatic amines .Phenols : nomenclature , physical properties , salts of phenols . | 3 | **Dr. Pemanos Yalda Bakoz** |
| Preparation and reactions of phenols .Reactions related to phenols , Kolbe reaction , Reimer Tiemann reaction , Fries rearrangement . | 3 | **Dr. Pemanos Yalda Bakoz** |
| Aryl halides : physical properties preparation . | 3 | **Dr. Pemanos Yalda Bakoz** |

**Practical organic chemistry**

|  |  |  |
| --- | --- | --- |
| Organic Chemistry I \First & second courses.  (Hours per week) | Practical | 3 Hours |
| **Lecturers** | **Mr. Mohammed Salim** | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Organic Chemistry II** (Practical) | **Name of experiment** | **Hour** | **Lecturer** |
| Determination of Melting point  Determination the Melting point of unknown  Mixed melting point  Determination of Boiling point  Determination the Boiling point of Unknown  Simple distillation  Fractional distillation  Steam distillation  Vacuum distillation  Recrystallizaion  Sublimation  Extraction  **Examination of first semester**  Qualitative elemental analysis  Unknown of sodium fusion test  Preparation of Methane gas  Preparation of acetylene gas  Preparation of cyclo hexane  Preparation of propanal  Preparation of acetanilide /(Two weeks)  Preparation of benzoic acid  Preparation of ethyl acetate (esterfication)  Nitration of methyl benzoate  Diels-Alder reaction  Preparation of Cyclohexanone  Analysis and Identification of product  Cis-trans isomerism of maleic and fumaric acids. | 3  3  3  3  3  3  3  3  3  3  3  3  3  3  3  3  3  3  3  3  3  3  3  3  3 | **Mr. Mohammed Salim** |

### ***human Anatomy:***

|  |  |
| --- | --- |
| **Time (in hours) per week** | Theory: 3  Practical:4 |
| **Lecturer** | **Dr. Aamr Ayub Yousif** |

**The Theoretical Topics:**

|  |  |  |  |
| --- | --- | --- | --- |
| Human Anatomy | **Subject** | **Hours** | **Lecturers** |
| Terms of Position and Movement | 4 | **Dr. Aamr Ayub Yousif** |
| Terms of Position and Movement | 2 | **Dr. Aamr Ayub Yousif** |
| Head and Neck (2 parts) | 6 | **Dr. Aamr Ayub Yousif** |
| Thorax | 4 | **Dr. Aamr Ayub Yousif** |
| Abdomen | 4 | **Dr. Aamr Ayub Yousif** |
| Pelvic | 2 | **Dr. Aamr Ayub Yousif** |
| Upper Limb | 2 | **Dr. Aamr Ayub Yousif** |
| Lower Limb | 2 | **Dr. Aamr Ayub Yousif** |
| The Autonomic Nervous system | 2 | **Dr. Aamr Ayub Yousif** |
| The Sympathetic Nervous system | 4 | **Dr. Aamr Ayub Yousif** |
| The Parasympathetic Nervous system | 4 | **Dr. Aamr Ayub Yousif** |
| The Organs Innervations (2 parts) | 8 | **Dr. Aamr Ayub Yousif** |
| The Brain (2 parts) | 6 | **Dr. Aamr Ayub Yousif** |
| The Cranial Nerves | 2 | **Dr. Aamr Ayub Yousif** |

### Practical Topics

|  |  |  |
| --- | --- | --- |
| 1**-** Terms of Position and Movement  2-Structures Met in  3- Head and Neck (2 parts)  4-Thorax  5-Abdomen  6-Pelvic  7- Upper Limb  8-Lower Limb  9- The Autonomic Nervous system  10- The Sympathetic Nervous system  11- The Parasympathetic Nervous system  12-The Organs Innervations (2 parts)  13-The Brain (2 parts)  14- The Cranial Nerves | (4 hours)  (4 hours)  (4 hours)  (4 hours)  (4 hours)  (4 hours)  (4 hours)  (4 hours)  (4 hours)  (4 hours)  (4 hours)  (4 hours)  (4 hours)  (4 hours) | **Dr. Aamr Ayub Yousif** |

### ***Medical microbiology (Bacteriology):***

|  |  |
| --- | --- |
| **Time(in hours) per week** | Theory: 3 hr  Practical: 4 hr |
| **Lecturers** | **Dr. Jasim Mohamed Abdo**  **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/)  **Dr. Shershad Majeed Tahir** |

**The Theoretical** **Topics**

|  |  |  |  |
| --- | --- | --- | --- |
| Medical microbiology | Topic | Hours | Lecturer |
| Gram positive cocci   * Staphylococci * Streptococci | 4 | **Dr. Jasim Mohamed Abdo** |
| Gram positive spor-forming bacilli   * Anthrax * Anthracoid | 4 | **Dr. Shershad Majeed Tahir** |
| * Corynebacterium * Enteric Gram negative bacilli * E coli * Klebsiella group   Enterobacter-proteus –citrbacter | 4 | **Dr. Jasim Mohamed Abdo** |
| Salmonella –Shigella | 2 | **Dr. Jasim Mohamed Abdo** |
| Gram-negative bacilli   * Hemophlius * Pseudomonas | 2 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Gram-negative cocci   * Neisseria   Acenotobacter | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Brucella, MYCOBACTERIUM | 4 | **Dr. Shershad Majeed Tahir** |
| Vibrio, Campylobacter. H pylori | 4 | **Dr. Shershad Majeed Tahir** |
| Spirocheates | 2 | **Dr. Shershad Majeed Tahir** |
| Mycoplasma | 2 | **Dr. Shershad Majeed Tahir** |

**Practical:**

|  |  |  |  |
| --- | --- | --- | --- |
| Medical microbiology **(Practical)** | General Bacteriology Procedures | Hours | Lecturer |
| Laboratory Safety Protocol | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Sterilization and disinfection | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Sample collection | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Bacteriological culture media & a plate culturing methods | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Preparation of smears & staining techniques | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Antibiotic Sensitivity Methods | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Systematic identification of bacteria |  | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Staphyllococcus | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Streptococcus | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Bacillus | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Clostridium | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Family Enterobacteriaceae |  | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Biochemical tests | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| E. coli & Klebsiella, Salmonella, Shigella, Proteus | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Neisseria | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Pseudomonas | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Vibrio cholera | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Mycobacterium tuberculosis | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |
| Corynebacteriumdiphtheria | 4 | **Dr.** [**Nebal Sami Michael**](http://web.uod.ac/ac/c/cop/branches/medicinal-chemistry/academic-members/nebal-sami-michael/) |

### ***introduction to Pharmaceutical Sc. (physical pharmacy)***

|  |  |
| --- | --- |
| **Course hours** | Theory (45) hours. ( 2 hours per week ) |
| Lecturers | **Dr. Reveng Abdullah Abdulkareem** |

**The Theoretical Topics:**

|  |  |  |  |
| --- | --- | --- | --- |
| physical pharmacy | **Subjects** | **Hours** | Lecturers |
| State of matter |  |  |
| - Binding forces between molecules | 2 |  |
| - Gaseous state | 2 |  |
| - liquid state | 2 |  |
| * Solid and crystalline matters * Phase equilibrium, and phase rule, thermal analysis | 2 |  |
| Thermodynamics: |  |  |
| - first law, thermochemistry | 2 |  |
| - Second law | 2 |  |
| - third law | 2 |  |
| - Free energy function and applications | 2 | **Dr. Reveng Abdullah Abdulkareem** |
|  |  |  |
| Solution of non-electrolyte, 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 equilibrium, modern theories of acids, bases and salts, acid-base equilibrium, calculation of pH, acidity constants, the effect of ionic strength and free energy. | 8 |  |
|  |  |  |
| Buffered and isotonic solutions: Buffer equation; buffer capacity; method of adjusting tonicity and pH; buffer and biological system. | 7 |  |

No practical.

### ***human PHYSIOLOGY* I*:***

|  |  |
| --- | --- |
| **Time (in hours)** | **Theory2**  **Practical 3 (for each of 2groups).** |
| **Lecturers** | **Dr. Suzan Omer Rasool**  **Dr. Burhan Abdullah Zaman Ali** |

**The Theoretical Topics:**

|  |  |  |  |
| --- | --- | --- | --- |
| HumanPhysiology i | **Subject** | **Hour**s | **Lecturers** |
| Cell and membrane Physiology | 2 | **Dr. Suzan Omer Rasool** |
| Physiology of the muscles | 2 | **Dr. Suzan Omer Rasool** |
| Physiology of the nerves | 4 | **Dr. Suzan Omer Rasool** |
| Autonomic nervous system physiology | 2 | **Dr. Suzan Omer Rasool** |
| Central nervous system physiology | 8 | **Dr. Suzan Omer Rasool** |
| Physiology of blood | 6 | **Dr. Suzan Omer Rasool** |
| Cardiovascular system physiology (Heart and circulation) | 8 | **Dr. Suzan Omer Rasool** |

**Practical Topics**

|  |  |  |  |
| --- | --- | --- | --- |
| HumanPhysiology i (Practical) | **Subject** | **Hour**s | **Lecturers** |
| 1: Collection & handling of blood sample | 2 | **Dr. Burhan Abdullah Zaman** |
| 2: Hemoglobin Estimation | 2 | **Dr. Burhan Abdullah Zaman** |
| 3: Manual leukocytes count | 4 | **Dr. Burhan Abdullah Zaman** |
| 4: The acute-phase response, Erythrocyte Sedimentation Rate (ESR) | 2 | **Dr. Burhan Abdullah Zaman** |
| 5: Reticulocyte count | 4 | **Dr. Burhan Abdullah Zaman** |
| 6: White blood cell differential | 6 | **Dr. Burhan Abdullah Zaman** |
| 7: Automatic electronic blood cell counting | 3 | **Dr. Burhan Abdullah Zaman** |
| 8: Blood group systems | 3 | **Dr. Burhan Abdullah Zaman** |
| 9: Erythrocyte osmotic fragility test | 2 | **Dr. Burhan Abdullah Zaman** |
| 10: Coagulation study (I) | 2 | **Dr. Burhan Abdullah Zaman** |
| 11: Blood compatibility testing | 2 | **Dr. Burhan Abdullah Zaman** |
| 12: Coagulation study (II) | 2 | **Dr. Burhan Abdullah Zaman** |

### ***pharmacoeconomics***

|  |  |
| --- | --- |
| **Time (in hours)** | Theory 34 hours |
| **Lecturers** | **Dr.** [**Julian Ismail Benyamen Ismail**](http://web.uod.ac/ac/c/cop/branches/pharmacology-and-clinical-pharmacy/academic-members/julian-ismail-benyamen-ismail/) |

### **Second semester:**

### **Ph. Organic chemistry III:**

|  |  |
| --- | --- |
| **Time (in hours)** | **Theory 2** |
| **Lecturers** | **Dr. Pemanos Yalda Bakoz** |

**Theoretical Topics:**

**Practical Topics:**

|  |  |
| --- | --- |
| **Time (in hours)** | **Practical 3 (for each of 2groups).** |
| **Lecturers** | **Mr. Mohammed Salim** |

|  |  |  |  |
| --- | --- | --- | --- |
| HumanPhysiology i (Practical) | **Subject** | **Hour**s | **Lecturers** |
| 1. Assay of sodium benzoate | 3 | **Mr. Mohammed Salim** |
| 1. Assay of Borax (known) | 3 | **Mr. Mohammed Salim** |
| 1. Assay of Borax (unknown) | 3 | **Mr. Mohammed Salim** |
| 1. Assay of citric acid | 3 | **Mr. Mohammed Salim** |
| 1. Assay of Magnesium hydroxide | 3 | **Mr. Mohammed Salim** |
| 1. Assay of Magnesium hydroxide (unknown) | 3 | **Mr. Mohammed Salim** |
| 1. Preparation and standardization of 0.1 N KMnO4 (known sample). | 3 | **Mr. Mohammed Salim** |
| 1. Preparation and standardization of 0.1 N KMnO4. (Quiz & unknown). | 3 | **Mr. Mohammed Salim** |
| 1. Assay of Hydrogen peroxide solution. (Known sample). | 3 | **Mr. Mohammed Salim** |
| 1. Assay of Hydrogen peroxide solution. (Quiz & unknown) | 3 | **Mr. Mohammed Salim** |

### **2. accounting:**

### **3. human physiology II:**

|  |  |
| --- | --- |
| **Time (in hours)** | * Theory3 * Practical 3 (for each of 2groups). |

**The topics theoretical**

|  |  |  |
| --- | --- | --- |
| **S** | **SUBJECT** | **Hour** |
| 8 | Physiology of the endocrine glands (endocrinology) | 8 |
| 9 | Gastrointestinal physiology | 4 |
| 10 | Physiology of respiration | 4 |
| 11 | Renal and acid-base balance physiology(The kidneys and body fluids) | 4 |
| 12 | Female reproductive system physiology | 2 |
| 13 | Male reproductive system physiology | 2 |
| 14 | Physiology of special senses | 2 |

***8.Physiology of the Endocrine Glands (Endocrinology) (8 hours)***

**Main Topics:**

The endocrine system physiology, including types of endocrine glands, other organs which have an endocrine functions, classifications of the hormones and their receptors , their mechanism of actions and effects on the various target cells in the body and the important hormonal regulator pathways, secretion disorders and assessment of glandular hypo and hyperactivity.

**Aim:**

To provide the basic knowledge of the endocrine system physiology for the students, including types of endocrine glands, other organs which have an endocrine functions, classifications of the hormones and their receptors , their mechanism of actions and effects on the various target cells in the body and the important hormonal regulator pathways, secretion disorders and assessment of glandular hypo and hyperactivity.

***9.Gastrointestinal physiology: (4 hours)***

**Main topics:**

1. Control of GIT- Neural- Enteric nervous system & extrinsic control by autonomic nervous system, Hormonal control.
2. Movements of GIT- mastication, swallowing. Motor functions of stomach, movements of small intestine, movements of large intestine. Mass movement, Defecation.
3. Secretary functions of GIT- mucus, saliva, control of salivary secretions, esophageal secretion. Gastric secretions , phases & regulations, Pancreatic secretions, phases & regulation, Biliary secretion, enterohepatic circulation of bile salts, secretions of small intestine, secretions of large intestine.
4. The liver functions.
5. Digestion- carbohydrate, protein & fat.
6. Absorption- carbohydrate, protein & fat.
7. GI disorders- paralysis of swallowing, achalasia, gastritis, peptic ulcers, pancreatic diseases, constipation, diarrhea, vomiting.

**Aims:**

To understand the nervous & hormonal regulation of GIT, movements of each part of GIT, secretions of each part of GIT, the importance of the liver functions in metabolism, how digestion & absorption of nutrients occurs, the pathophysiology of some GI disorders.

***10.Physiology of respiration: (4 hours)***

**Main topics:**

Mechanisms of pulmonary ventilation. Pleural pressure, alveolar pressure, transpulmonary pressure, surfactant & surface tension, Spirometry, pulmonary volumes & capacities, minute respiratory volume, rate of alveolar ventilation, dead space, functions of respiratory passages, actions of cilia & mucus coat. Cough reflex, nervous & local control of bronchiolar musculature, pulmonary circulation, effects of hydrostatic pressure on pulmonary blood flow, pulmonary edema, pleural cavity & pleural effusion, gas exchange & partial pressures of gases, vapor pressure of water, diffusion of gases through the respiratory membrane & factors affect rate of diffusion, ventilation-perfusion ratio, gas transport including transport of O2 & CO2 by the blood, O2-hemoglobin dissociation curve, CO poisoning, regulation of respiration, respiratory centers, Hering-Breuer inflation reflex, chemical control of respiration, The role of chemoreceptors in control of respiration, periodic breathing, methods for studying respiratory abnormalities including maximum expiratory flow rate, forced expiratory vital capacity & FEV 1, Respiratory insufficiency Emphysema, Pneumonia, TB, atelectasis, asthma, hypoxia &hypercapnia.

**Aims:**

To understand the 2 phases of pulmonary ventilation (inspiration & expiration), Different pressures in respiratory physiology, the importance of surfactant in decreasing surface tension in the alveoli, the lung function tests, to study the functions of respiratory passages, cilia & mucus coat, the cough reflex, the nervous & local control of bronchiolar tone, the pulmonary circulation, the gas exchange mechanisms & their diffusion through the respiratory membrane, ventilation-perfusion ratio, gas transport by the blood, O2-hemoglobin dissociation curve, CO poisoning, regulation of respiration, methods for studying respiratory abnormalities, & the pathophysiology of some respiratory diseases.

1. ***Renal and acid-base balance physiology (The kidneys and body fluids) (4 hours)***

**Main Topics:**

Basics functions of the kidney, glomerular filtration rate, creatinine clearance, renal tubules reabsorption and secretion processes, renal threshold for glucose, counter current and acid base balance mechanisms, different types of diuretics and their mechanisms of action, urolithiasis and important renal diseases. Physiology of Micturition and its disorders.

**Aim:**

To teach the physiology of the urinary system, provides students with the basic knowledge inthe homeostatic functions of the kidneys.

1. ***Female reproductive system physiology (2 hours)***

**Main topics:**

Ovarian functions, Female hormonal system, gonadotropic hormones, Ovarian cycle, Follicular, ovulatory & luteal phase, Endometrial cycle. Proliferative, secretory & menstrual phase, Anovulatory cycles, Cyclical changes in uterine cervix, vaginal epithelium & breasts, Menopause, Ovarian hormones estrogen & progesterone; (chemistry, synthesis, transport in blood, fate & functions), Relaxin, Hypothalamic control of ovarian functios, Abnormalities of ovarian functions, Pregnancy- fertilization, implantation of blastocyst, functions of placenta, hormonal factors of pregnancy, Parturition-hormonal & mechanical factors and Lactation-initiation, milk ejection, hypothalamic control.

**Aims:**

To understand the ovarian functions, female hormonal systems, the cyclical changes that occurs in the ovaries, uterus, cervical discharge, vaginal epithelium & breasts, the menopause & the anovulatory cycles, the ovarian hormones, their hypothalamic control. Some abnormalities of ovarian functions, the hormonal factors of pregnancy & factors initiate parturition, lactation hormonal control.

1. ***Male reproductive system physiology: (2 hours)***

Male organs of reproduction, functions of male reproductive system, the structure of the scrotum, external and internal anatomy of the testes, testicular counter – current system and its physiological significance, microscopic anatomy of the seminiferous tubules, leydig cells, sertoli cells, stages of spermatogenesis, hormonal control of spermatogenesis, and feed – back control of blood level of testosterone, physiological actions of testosterone and dihydrotestosterone.

1. ***Physiology of Special senses: (2 hours)***

**Main topics:**

***Vision :*** anatomical considerations, neural pathway, principles of optics, accommodation reflex, near point & near response, papillary reflex, errors of refraction, photochemistry of vision, light & dark adaptation, color vision, visual acuity, visual field examination.

***Hearing & equilibrium :*** anatomical considerations of external, middle & inner ear, organ of Corti, the semicircular canals, sound, types of conduction, attenuation reflex, auditory pathway, hearing abnormalities, vestibular pathway.

***Taste :***primary sensation of taste, taste buds, taste pathway.

***Smell :***the olfactory membrane, olfactory cells, receptor & pathway.

**Aims:**

To understand the neural pathway of different senses, effects of lesions in neural pathway & some abnormalities.

**Practical Course**

***Second semester:***9 sessions (each 3 hours):

1- Body temperature measurement.

2- Measurement of arterial blood pressure & pulse rate.

3- Effects of exercise.

4-Electrocardiogram (ECG).

5-Reflexes

6- Cranial nerve examination.

7- Ear examination.

8- Vision.

9- Spirometer.

### **4. medical microbiology (Parasitology)**

* **Assessment scheme**

### **immunology:**

1. **Assessment scheme**

### **6. Physical Pharmacy II:**

|  |  |
| --- | --- |
| **Time (in hours) per week** | Theory: 3  Practical 3 (for each of 2groups) |

* **Assessment scheme**

Activities & Quizzes 10%

Midterm 20%

Final exam (Comprehensive) 45%

Practical 25%

Total 100%

**Course overview:**

The Physical pharmacy course is provided to Pharmacy students in the 1st and 2nd semesters in the 2rd year. This course is designed to introduce pharmacy students to the application of physical chemical principles to the pharmaceutical sciences and it aided the students in their attempt to predict the solubility, stability and compatibility, and biologic action of drug products.

**Course objective:**

The goal of the Physical pharmacy course is to assure that our students obtain a thorough comprehension of the basic physicochemical principles necessary for developing effective and safe dosage formsand understanding the main properties of each of these dosage forms.

**References**

1. Martin. Physical Pharmacy and Pharmaceutical Sciences, 6th Ed. New York: Lippincott Williams & Wilkins, 2011.

**The Topics:theoritical**

|  |  |
| --- | --- |
| **Subjects** | **Hours** |
| Solubility and distribution Phenomena | 9 |
| Complexation and protein binding | 6 |
| Kinetic phenomena | 9 |
| Dispersed systems (interfacial phenomena, Colloids and Coarse dispersion  Micrometric and Rheology  Biomaterial and drug delivery | 6  6  6 |

**Practical Topics: None**

third year

### first semester

### *biochemistry│:-*

### *pharmacognosy* :

### *Pharmacology***│ :**

|  |  |
| --- | --- |
| **Course hours** | **Theory (45) hours** |

* **Assessment scheme**

**-** Mid-Term examination (30) marks

- Quizzes examination (10) marks

- Final examination (60) marks

**Course overview:**

This Pharmacology course is provided to pharmacy students in the 1st semester in the 3rd year and it covered by 3 hours per week. Pharmacology I is designed to provide general information related to basics of pharmacology and pharmacology of ANS, Cardiovascular, GIT and Respiratory system. Pharmacology I require a strong sense of commitment from students and their active attendance for all aspects of the course.Topics will include the basic principles of pharmacology and several major classes of therapeutic agents, with attention to their mechanisms of action clinical uses and their side effects.We strongly advice students to take the time to read through this course book, it contains most of the information that they will needs during the first semester of academic year 2014-2015.

**Course objective:**

The goal of the Pharmacology I course is to assure that our students obtain a thorough comprehension of the basic pharmacological principles necessary for developing effective and safe therapeutic regimens for their patients.

**References**

1. Katzung. Basic and clinical pharmacology, 10th edition. New York: McGrawHill, 2012.
2. Howland RD, Mycek MJ. Lipincotts Illustrated Reviews Pharmacology, 6th edition, 2015 lippincott William and Wilkins, Philadelphia.
3. Goodman and Gilman. The Pharmacological Basis of Therapeutics, 11th edition. New York: McGrawHill, 2006

**The Topics:**

|  |  |  |
| --- | --- | --- |
| **S** | **Subjects** | **Hours** |
| 1 | **Principle of Pharmacology** |  |
|  | - Introduction to Pharmacology | **2** |
|  | - Drug Receptors & Pharmacodynamics | **3** |
|  | - Rational Dosing & the Time Course of Drug Action | **1** |
|  | - Pharmacokinetics Absorption, Distribution Drug Biotransformation and Excretion. | **4** |
| 2 | Autonomic Pharmacology |  |
|  | - Introduction to Autonomic Pharmacology | **2** |
|  | - Cholinoceptor-Activating & Cholinesterase-Inhibiting Drugs | **2** |
|  | - Cholinoceptor-Blocking Drugs. | **2** |
|  | - Adrenoceptor-Activating & Other Sympathomimetic Drugs | **2** |
|  | - Adrenoceptor Antagonist Drugs | **2** |
| 3 | Cardiovascular and renal drugs |  |
|  | - Diuretic Agents | **2** |
|  | - Antihypertensive Agents | **3** |
|  | - Vasodilators & the Treatment of Angina Pectoris | **2** |
|  | - Drugs Used in Heart Failure | **2** |
|  | - Antiarrhythmic Drugs | **2** |
|  | - Drugs affecting hemostasis | **2** |
|  | - Antihyperlipidemic drugs | **2** |
|  |  |  |
| 4 | Gastrointestinal and antiemetic drugs | 3 |
|  |  |  |
| 5 | Drugs acting on the respiratory system | **3** |
|  |  |  |

Second semester

### *biochemistry│:-*

### *pharmacognosy* :

### *Pharmacology***│:**

|  |  |
| --- | --- |
| **Course hours** | **Theory (60) hours**  **Practical (60 ) hours** |

* **Assessment scheme**

**-** Midterm examination **(**40**)** marks

- Final examination (60) marks

**Course overview:**

This Pharmacology course is provided to Pharmacy students in the 2nd semesters in the 3rd year and it covered by 2 hours per week. This course is designed to develop an understanding of basic knowledge in drug action and the pharmacological bases of drug used and drug classes to enable students to practice the proper, effective and safe use of drugs. Pharmacology course requires a strong sense of commitment from students and their active attendance for all aspects of the course.

**Course objective:**

The goal of the Medical Pharmacology course is to assure that our students obtain a thorough comprehension of the basic pharmacological principles necessary for developing effective and safe therapeutic regimens for their patients.

**Reference**

1. Goodman and Gilman. The Pharmacological Basis of Therapeutics, 11th edition. New York: McGrawHill, 2006.
2. Katzung. Basic and clinical pharmacology, 10th edition. New York: McGrawHill, 2009.
3. Laurence. Clinical Pharmacology, 9th edition. New York CHURCHILL LIVINGSTONE 2003.

**The Topics:**

|  |  |  |  |
| --- | --- | --- | --- |
| **S** | **Subjects** |  | **Hours** |
|  |  |  |  |
| 4 | Pharmacology of CNS Drugs |  |  |
|  | - Sedative-Hypnotic Drugs |  | **1** |
|  | - Antiseizure Drugs. |  | **1** |
|  | - General and local Anesthetics | **2** |
|  | - Skeletal Muscle Relaxants |  | **1** |
|  | - Pharmacologic Management of Parkinsonism & Other Movement disorders | **2** |
|  | - Antipsychotic Agents | **1** |
|  | - Antidepressant Agents |  | **1** |
|  | - Opioid Analgesics & Antagonists | **2** |
|  | - Drugs of Abuse |  | **1** |
|  |  |  |
| 5 | Drugs used in treatment of gastrointestinal diseases |  |
|  | - Peptic ulcer disease | **1** |
|  | - Laxative and Antiemetics |  | **1** |
|  | - Inflammatory bowel disease and IBS | **2** |
|  |  |  |
| 6 | **Drugs with important action on smooth muscles** |  |
|  | - Histamine , serotonin and Ergot Alkaloids | **1** |
|  | - Vasoactive peptides |  | **1** |
|  | - Prostaglandins and related compounds | **1** |
|  | - Nitric oxide | **1** |
|  | - Drugs used in asthma |  | **1** |
|  |  |  |
| 7 | **Drugs used to treat diseaseof the blood , inflammation and gout** |  |
|  | Drugs used in anemia | **1** |
|  | Drugs used in coagulative disorders | **1** |
|  | Drugs used in hyperlipidemia |  | **1** |
|  | Non steroidal anti-inflammatory drugs and drug used in gout | **2** |
|  |  |  |  |
| 8 | **Chemotherapeutic Drugs** |  |  |
|  | - Beta lactams |  | **1** |
|  | **-** Protein synthesis inhibitors | **1** |
|  | - Antimetabolites antibiotics |  | **1** |
|  | **-** Nucleic acid synthesis inhibitors | **1** |
|  | - Antimycobacterial drugs |  | **1** |
|  | - Antifungal drugs | **2** |
|  | - Antiviral drugs | **2** |
|  | - Antiprotozoal drugs |  | **1** |
|  | - Anthelmintic drugs |  | **1** |
|  | - Cancer chemotherapeutic agents | **2** |
|  | **-** Immunopharmacology |  | **1** |
|  |  |  |  |

### *Medicinal chemistry*  :

### *pharmaceutical compounding and technology*:

### *Pathophysiology:*

**INTRODUCTION**:

Pathology literally means the study (*logos*) of suffering (*pathos*). It is a discipline that bridges the gap between basic sciences and clinical practice. Pathology includes the investigation of the causes (*etiology*) as well as underlying mechanisms (*pathogenesis*) that results in clinical symptoms and signs of diseases. Pathologists identify the changes in the gross and microscopic appearance (morphology) of cells and tissues as well as alteration in body fluids, coupled with a multitude of biochemical, molecular, microbiological and immunological techniques to be able to reach a conclusive diagnosis and to understand the underlying mechanisms. The course includes two main parts, in its first part which is *General Pathology* the student is introduced to the fundamental cellular and tissue responses to pathologic stimuli; while the second part which is *Systemic Pathology* focuses on the responses of particular specialized organs.

***AIMS OF THE COURSE:***

1. Establish a link between the basic sciences that the student covered in his first two years at medical school and clinical sciences that he is going to cover in his next three years.
2. Establish the concept that "understanding the basis of the disease process, causes and underlying mechanisms as an important cornerstone in clinical medicine".
3. Teach students how the normal structure and function of cells and tissues is altered by various disease processes and how does this lead to various signs and symptoms
4. Teach students how to use various tools, including morphology, molecular biochemical, immunological and microbiological ones to identify and differentiate between various disease processes effectively.

**References:**

1. Kumar V, Abbas AK, Fausto N, Mitchell RN. ***Robbins Basic Pathology***. 8th Edition. Saunders Elsever , Philadelphia, 2007.
2. **Journals:**Histopathology, Cancer, Blood and British Journal of Haematology.

## General pathology

**INTRODUCTION: (one hour)**

CELL INJURY AND CELL DEATH: one **hour**

Definitions of pathology

History

Basis of pathology

Normal homeostasis

Cell injury: reversible and irreversible with their morphological expressions

Necrosis and its types

Apoptosis: molecular basis and morphology

# ADAPTATION, INTRACELLULAR ACCUMULATIONS AND CELL AGING: one hour

Cell, tissue and organ adaptation

Types of adaptation and mechanisms

Intracellular and tissue deposits and accumulations: types, exogenous and endogenous

Molecular mechanisms of adaptation

Metaplasia, Hyperplasia, hypertrophy and atrophy: morphology and molecular mechanisms

Fatty change; mechanisms and morphology

Calcification

Cellular aging; molecular mechanisms

**Practical 2 hours; For cell injury and Adaption.**

# INFLAMMATION: 2 hours

Acute inflammation: cardinal signs, molecular mechanisms, tissue changes, vascular changes, cellular changes, chemical mediators, chemotaxis, and phagocytosis

Complement system: functions, pathways, and regulators

Cytokines and chemokine

Outcomes of acute inflammation

Chronic inflammation; histological features, morphological expressions

Types of chronic inflammation

Ulcer

# TISSUE REPAIR AND WOUND HEALING: one hour

Definitions

Control of cell growth

Stimulators and inhibitors of cell growth

Cell cycle; stages and controlling molecular mechanisms

Cell growth; signal transduction systems, regulators of cell division: cyclins and cyclin-dependent kinases

Cell growth inhibitors

Extracellular matrix and cell interactions

Repair by fibrosis

Angiogenesis: molecular mechanisms, promoters and inhibitors

Granulation tissue and fibrosis

Tissue remodeling

Wound healing; primary and secondary intention

Local and systemic factors affecting wound healing

Pathological aspects of wound healing.

**Inflammation and tissue Repair:** 2 hours practical

### INFECTION: 2 hours

Types of infections

Bacterial infection

Tuberculosis, Leprosy

Syphilis

Viral infection

**2 hours practical**

# THE IMMUNE SYSTEM: 4 hours

Aims of the course:

The students should have adequate knowledge about:

1. Introduction to the normal immune system
2. Hypersensitivity reactions, their types, mechanisms and clinical examples.
3. Autoimmune diseases: Classification, Self tolerance, mechanisms of break of self tolerance, clinical examples, detailed discussion about SLE & RA.
4. Immunodeficiency: Definition, clinical presentation, classification, primary immunodeficiency and secondary immunodeficiency including AIDS
5. Tissue transplantation: HLA system, transplant rejection, Bone marrow transplantation and GVH disease.
6. Amyloidosis: Definition, types, diagnosis & prognosis.

Theory:

- Introduction & hypersensitivity reaction

- Autoimmune diseases

- Immunodeficiency & detailed discussion about AIDS

- Tissue transplantation, complications, method of increased graft survival, Bone marrow transplantation & GVH disease, HLA system, Amyloidosis.

Practical:

2 hours: revision of the lectures, slide show about amyloidosis.

**HEMODYNAMICS: 4 hours**

Edema

Congestion

Shock

Thrombosis and Embolism

Causes of thrombosis

Morphology of thrombus

Fate of a Thrombus

Laboratory tests used

Clinical features of DVT

Embolism

Effects of emboli

Pulmonary Embolism

Systemic Thromboembolism

Infarction.

**2 hours Practical**

**Genetics and Molecular Pathology: 4 hours**

**Aim of the course:**

The student should become knowledgeable in the following topics:

1. The structure and expression of Genes.
2. Mutations and their types.
3. The concept of Phenotype and Genotype.
4. The classification and main features of Genetic disorders .
5. The terminology of chromosomal disorders and some important examples.
6. The methods used in the diagnosis of genetic disorders, including karyoptyping , FISH and polymerase chain reaction.

**Contents of the course:**

Lecture 1: Introduction to DNA structure, Gene Structure, gene expression. Mutations, types and examples.

Lecture 2

Nomenclature of Genetic disorders

Classification of Genetic disorders

1.Single Gene Disorders

* Autosomal dominant disorders and examples
* Autosomal recessive disorders and examples

Lecture3

- Sex linked recessive and examples

2.Polygenic disorders

Lecture 4

3.Chromosomal Abnormalities :

Numerical

Involving Autosomes

Involving Sex chromosomes

Others.

4. Acquired Somatic disorders

PRACTICAL INTERACTIVE Medical Genetics SESSION : (2 hours)

Examples of clinical case studies in medical genetics,

Overview of molecular diagnostic tests.

**NEOPLASIA: 4 hours**

Classification of tumors

Anaplasia

Grading of malignant tumors

Staging of tumors

Spread of tumors

Epidemiology of cancer

Molecular Bases of Carcinogenesis

Effects of tumors

Paraneoplastic syndromes

Laboratory diagnosis of tumors

**4 hours Practical**

#### Systemic pathology

### RESPIRATORY SYSTEM: 2 hours

Lesions of upper respiratory tract

Laryngitis

Tumors of upper respiratory tract

Lung

Pulmonary collapse (atelectasis)

Pneumonia

Pulmonary Tuberculosis

Chronic obstructive lung diseases

Chronic Bronchitis

Bronchial Asthma

Bronchiectasis

Pulmonary Emphysema

Hyaline Membrane Disease

Pneumoconiosis

Tumors of the lung

Pleura

Pleural effusion

Empyema

Hemothorax

Pneumothorax

Tumors of the pleura.

**2hours practical.**

***Pathology of the blood vessels & the heart: 4* hours**

**Aims of the course:**

The students should receive adequate knowledge about:

1. Diseases of blood vessels including:
2. Atherosclerosis: The pathogenesis, risk factors, the pathology & the complications.
3. Hypertension: Diagnosis, etiology, clinical types, the effects on the heart & blood vessels.
4. Vasculitis: Classification & discussion about the most important types including polyarteritisnodosa, Giant cell arteritis, Beurger’s diseases, Wegenersgranulomatosis& others.
5. Aneurysm: Definition, atheromatous, syphilitic, congenital &mycotic.
6. Aortic dissection: Predisposing factors, clinical presentation & fate.
7. Venous disorders: Varicose veins.
8. Vascular tumors.
9. The heart:
10. Heart failure: definition, classification, clinical & pathologic aspects.
11. Ischemic heart diseases: Angina pectoris, unstable angina, myocardial infarction.
12. Rheumatic fever
13. Infective endocarditis
14. Valvular& congenital heart diseases
15. Cardiomyopathies.
16. Cardiac tumors.

Theory:

- Normal vessel structure, arteriosclerosis, atherosclerosis, non-modifiable risk factors, major modifiable risk factors, minor risk factors. Pathogenesis of atheroma, stages of atheroma; fatty streaks, fibro fatty plaque & complicated atheroma. Clinical syndromes caused by atheroma.

- Hypertension : definition, classification: Benign & malignant, Primary & secondary. Vasuses of secondary type.Pathologic changes in the heart & blood vessels.

- Vascultitis, Classification. Pathologic findings.Polyarteritisnodosa, giant cell arteritis, Wegener’s granulomatosis, thrombangitisobliterans, Raynauds syndrome. Aneurysm: Definition, classification & complications. Aortic dissection: etiology, pathology & complications.

- Venous disorders, varicose veins. Vasculat tumors: Benign tumor hemangioma&glomangioma, intermediate group Kaposi sarcoma: clinical types & pathologic stages. Malignant group: angiosarcoma&lymphangiosarcoma.

- Heart failure: Definition, compensatory mechanisms, etiology, symptomatology, classification according to the side of the heart involved, cardiac output & onset.

Ischemic heart diseaes: Anatomy of the coronary circulation, Angina pectoris, Prinzmetals angina & myocardial infarction. The pathologic changes in MI in time sequence, the complications of MI.

- Rheumatic fever & rheumatic heart disease: pathogenesis, diagnostic criteria, pathologic findings in the endocardiun, myocardium & pericardium. Complications of rheumatic fever. Infective endocarditis: acute &subacute, causes, clinical course, complications & fate.

- Congenital heart diseases: classification to cyanotic &acynotic groups, etiology & predisposing factors. Valvular heart diseases and hemodynamic effects.

- Cardiomyopathy, classification, cardiac tumors, and diseases of the pericardium.

Practical: Includes the following:

1. Slide show for atherosclerosis in different stages of development from fatty streaks to complicated atheroma, both grossly & microscopically. Vascular changes in hypertension including the hyaline & hyperplastic arteriolosclerosis. Vasculitis: The giant cell type &Beurgers. Raynauds : The appearance of fingers.
2. Aneurysms & dissections, varicose veins, vascular tumors
3. Myocardial infarction in different stages of evolutions. Gross appearance of infarcted heart & its complications.
4. Rheumatic fever slide show: Aschoff bodies, valvular lesions. Cardiomypathies slide show and cardiac tumors especially the myxoma.
5. With each lab there is a session to reminde the students about the theorotical bases of these slide shows.

**HAEMATOLOGY: 6 hours**

**AIMS of the course:**

The Student should become adequately knowledgeable in following topics :

* The normal physiology of blood and lymph nodes.
* The causes of various types of anemia (acquired and inherited), their clinical and laboratory findings, with particular emphasis on the regionally common causes like Iron deficiency, Thalassemia, sickle cell anemia and G6PD deficiency. As well as globally important anemias like megaloblastic anemia, spherocytosis and Immune hemolytic anemias.
* The clinical and laboratory features of various leucocyte disorders, including benign disorders, as well as Acute and chronic leukemia, Myeloproliferative neoplasms and Multiple Myeloma.
* Disorders of Hemostasis, clinical and laboratory investigations of bleeding and thrombotic disorders.
* Interpretation of Clinical signs and symptoms and correlating them to hematological test results.
* Interpretation of various changes encountered in blood counts and bone marrow examination.

**Contents of course:**

Theory: General Hematology – 5 hours.

Lymphoid System Disorders – 1hour.

**Theory:**

Introduction and Iron deficiency anemia.

Megaloblastic anemia.

Inherited Hemolytic anemia

G6PD Deficiency

Beta thalassemias

Alpha thalassemia and sickling disorders.

Acquired Hemolytic anemia

Introduction to Leucocyte disorders

Infectious mononucleosis

Acute Leukemia.

Chronic Myeloproliferative neoplasms.

Chronic Lymphoproliferative neoplasms.

Haemostasis.

Bleeding and thrombotic disorders.

Lymphoid system, normal structure and function.

Malignant Lymphomas

.GASTROINTESTINAL PATHOLOGY: 4 **hours**

* Oesophagus

Congenital anomalies

Motor dysfunction-achalasia

Reflux esophagitis

Barrett’s oesophagus

Esophageal varices

Tumours: carcinoma

* Stomach

Congenital anomalies

Pyloric stenosis

Gastritis-types and grading, helicobacter

Peptic ulcer

Tumours

* Small and large intestine

Congenital anomalies

Intestinal inflammatory conditions, infectious and non-infectious/idiopathic inflammatory bowel disease

Malabsorption syndromes

Ischemic bowel injury

Diverticular disease

Tumours of the small and large intestine: epithelial and stromal, lymphoma

Adenoma-carcinoma sequence in colorectal cancer

Familial cancer syndromes – FAP and HNPCC

* Appendix

Appendicitis

Tumours

# HEPATOBILIARY AND PANCREATIC PATHOLOGY: onehour

**Aims of the course:**

The following items should be learned by the student:

1. Viral hepatitis, alcoholic hepatitis, drug induced liver damage
2. Cirhossis: definition & diagnostic criteria, morphologic & etiologic classes, effects of cirrhosis.
3. Liver tumors: secondary & the primary, benign & malignant
4. Diseases of the gall bladder: Cholecystis& gall stones.
5. Diseases of the pancreas: Acute & chronic pancreatitis, tumors of the pancreas.

### ENDOCRINE SYSTEM: 2 hours

Pituitary gland (Hyperpituitarism, Pituitary adenoma, Hypopituitarism)

Thyroid gland (Non-neoplastic Diseases of the Thyroid , Hypothyroidism, Thyrotoxicosis and Hyperthyroidism, Graves’ disease, Multinodular Goiter, Thyroiditis, Thyroid tumors)

Parathyoid glands (Hyperparathyroidism, Hypoparathyroidism)

Adrenal glands (Adrenal cortex, Adrenal cortical hyperactivity, Cushing syndrome, Aldosteronism, Adrenal medulla, Adrenal tumors.)

# URINARY SYSTEM PATHOLOGY: 4 hours

Review of function and histology

Clinical manifestations of renal diseases

Congenital anomalies

Polycystic diseases of the kidney

Glomerular diseases – nephritic and nephrotic syndromes

Acute tubular necrosis

Tubulointerstitial nephritis/pyelonephritis

Diseases of blood vessels: malignant hypertension and nephrosclerosis, renal artery stenosis, hemolytic-uremic syndrome

Obstructive uropathy/hydronephrosis

Urolithiasis

Tumours of the kidney and urinary bladder.

### MALE GENITAL TRACT: onehour

Aims of the course are to deliver adequate knowledge about:

1. Testicular tumors, male infertility, other scrotal & penile pathologies
2. Hyperplasia & carcinoma of the prostate
3. Sexually transmitted diseases.

**Female Reproductive System: 1 hour**

Students should be learned about:

1. Diseases of the vulva , vagina & cervix including infections, premalignant lesions & malignancies
2. Diseases of the uterus: Inflammations, hyperplasia, tumors, adenomyosis& endometriosis.
3. Tumors of the ovaries: The major classes & behavior
4. Pregnancy associated pathologies: Ectopic Pregnancy, H. mole, Choriocarcinoma.

### CENTRAL NERVOUS SYSTEM: onehour

Non-neoplastic lesions

Edema, herniation, & hydrocephalus

Vascular diseases

CNS trauma

Infections

CNS tumors

# SKIN PATHOLOGY: onehour

Anatomy of the skin and function

Definition of macroscopic terms

Types of skin biopsy

Infectious diseases of the skin: viral, bacterial and fungal infections

Non-infectious inflammatory diseases – patterns of inflammatory reaction

Vasculopathic skin diseases

Tumours of the skin: melanocytic, epidermal and dermal

### *Drug informatics*

### *Pharmacy practice experience │:*

fourth year (semester program)

first semester

### **Biopharmaceutics:**

|  |  |
| --- | --- |
| **Time (in hours) per week** | Theory: 2  Practical: non |

**Assessment scheme**

The exams are achieved in a written paper format. Question papers are written and reviewed by lecturers. Answer books are corrected and marked by the same lecturer. The total marks are 100 marks per semester distributed as follow:

- Written midterm examination (30) marks

- Written final term examination (60) marks

- Daily attendance, activities and quizzes (10) marks

**Course overview:**

The Biopharmaceutic course is provided to Pharmacy students in the 1st semester of the 4th year and it covered by two theoretical hours per week. At the beginning, the course introduces pharmacy students to fundamentals of biopharmaceutic as definition of it, steps of LADMER, bioavailability and bioequivalence. The different mechanisms and pathways by which drug is absorbed are also discussed. In addition, the physiological, physicochemical, and the dosage form related factors that affect absorption and bioavailability are one of the most important subjects that discussed. Then the physiology and anatomy of some routes of administration as GIT, nasal, skin, pulmonary, and others are discussed with the most common dosage forms administered by these routes of administration and the most common problems that must be overcome to make the drug easy to administer and absorb by certain route of administration. Finally, the in-vitro and in-vivo methods used for studding absorption and release profile of dosage form, then the in-vitro in-vivo correlation is discussed.Biopharmaceutics course requires a strong sense of commitment from students and their active attendance for all aspects of the course.

**Course objective:**

Is to make the student to understand the basics and principles of biopharmaceutic that can be applied for drug product development and drug therapy. Also to understand how the physic-chemical properties of drug, the dosage form factors and physiology and anatomy of route of administration factors will affect rate and extent of systemic drug absorption and bioavailability. An integrated presentation is used in these lectures to demonstrate the interrelationships between pharmaceuticals and biopharmaceutical principles, and drug product design.

**References**

1. Shargel L., Andrew B. (2005). Applied Biopharmaceutics and Pharmacokinetics. 5th ed. USA: McGraw-Hill.
2. Aulton’s. Pharmaceutics: The Design and Manufacture of Medicines, 3rdedition. Edinburgh CHURCHILL LIVINGSTONE, 2007.
3. Remington. The Science and Practice of Pharmacy, 20th edition. Maryland: Lippincott Williams & Wilkins, 2000.
4. Ansel’s. Pharmaceutical Dosage Forms and Drug Delivery Systems, 9th edition. Philadelphia: Wolters Kluwer Health, 2011

**The Topics:**

|  |  |
| --- | --- |
| * Fundamentals of bipharmaceutics * Absorption * Factors affecting absorption * Physiologic factors * Physico – chemical factors * Dosage form factors * Routes of administration * Absorption from different routes of administration * Methods for studying factors that affect drug absorption * In – vitro in – vivo correlation | Hrs  hrs  hrs  3 hrs  3 hrs  3 hrs  3 hrs  3 hrs  3 hrs  3 hrs |
| Practical Topics (If there is any) | Non |

### *pharmacology* :

|  |  |
| --- | --- |
| **Course hours** | **Theory (40) hours** |

**Students Evaluation Procedure:**

The total marks for Pharmacology III is (100) marks as follow**:**

- Short Quiz (5) marks

**-** Mid-Term examination (35) marks

- Final examination (60) marks

**Courseoverview:**

This Pharmacology course is provided to Pharmacy students in the 1st semester in the 4th year and it covered by 4 hours per week. This course is designed to develop an understanding of basic knowledge in drug action and the pharmacological bases of drug used and drug classes to enable students to practice the proper, effective and safe use of drugs.

**Courseobjective:**

The goal of the Medical Pharmacology course is to assure that our students obtain a thorough comprehension of the basic pharmacological principles necessary for developing effective and safe therapeutic regimens for their patients.

**References**

1. Katzung. Basic and clinical pharmacology, 10th edition. New York: McGrawHill, 2009.
2. Bennet and Brown. Clinical Pharmacology, 10th edition. New York CHURCHILL LIVINGSTONE 2008.
3. Goodman and Gilman. The Pharmacological Basis of Therapeutics, 11th edition. New York: McGrawHill, 2006.

**The topics**: theoretical

|  |  |  |  |
| --- | --- | --- | --- |
| **S** | **Subjects** | **Hours** | |
|  |  |  |
| 8 | **Chemotherapeutic Drugs** |  |
|  | - Introduction | **2** |
|  | - Beta lactams | **2** |
|  | **-** Protein synthesis inhibitors | **4** |
|  | - Antimetabolites antibiotics | **2** |
|  | **-** Nucleic acid synthesis inhibitors | **2** |
|  | - Antimycobacterial drugs | **2** |
|  | - Antifungal drugs | **2** |
|  | - Antiviral drugs | **2** |
|  | - Antiprotozoal drugs | **2** |
|  | - Anthelmintic drugs | **1** |
|  | - Cancer chemotherapeutic agents | **4** |
|  | **-** Immunopharmacology | **2** |
|  |  |  |
| **9** | **Endocrine Drugs** |  |
|  | - Thyroid and Antithyroid drugs | **2** |
|  | - Adrenocorticosteroids and their antagonists | **2** |
|  | - Antidiabetic drugs | **3** |
|  | - Gonadal hormones and their inhibitors | **4** |
|  | - Calcium homeostasis | **2** |

### *medicinal chemistry  :*

### *therapeutics I :*

|  |  |
| --- | --- |
| **Time** | **Theory 45 hours** |

**Students Evaluation Procedure:**

The total marks for therapeutics is (100) marks per semester distributed as follow**:**

1. Mid-Term examination: 30 marks
2. General Evaluation: 10 marks

(homework, quiz, class attendance and student behavior)

1. Final examination**:**60marks

**Introduction:**

This Therapeutics course is provided to medical students in the 1st semester of the 4th year and it covered by 4 hours per week. Therapeutics is designed to provide the most important concepts and principles related to drug management and clinical presentation of human diseases.Therapeutics is an integrated course which combines the patho-physiology and management of diseases with pharmacology and pharmacokinetics of drugs and use to treat the diseases as well as the preventive measures. The course is composed of lectures and case discussions. Therapeutics course requires a strong sense of commitment from students and their active attendance for all aspects of the course.Topics will include the basic principles of therapeutics and several major classes of therapeutic agents according to the systematic classification of human diseases, with attention to clinical uses, side effects and prevention.We strongly advice students to take the time to read through this course book, it contains most of the information that they will needs during the academic year.

**Goal of the Course:**

The goal of the Therapeutics course is to assure that our students obtain a thorough comprehension of the basic therapeutic principles necessary for developing effective and safe therapeutic regimens for their patients. It also aims to help students acquire insights in the basic principles of rational pharmacotherapy and to promote the communication with classmates and (future) pharmacists.

Note: Rational pharmacotherapy is defined as the selection and use of drugs based on effectiveness, safety, convenience, and economics.

**References**

# Pharmacotherapy: A Pathophysiologic Approach, 8th edition Joseph T. DiPiro, Robert L. Talbert, Gary C. Yee, Gary R. Matzke, Barbara G. Wells, L. Michael Posey. 2011.

# Applied Therapeutics\_The\_Clinical Use Of Drugs (9th\_Ed.\_2009).

# Pharmacotherapy Casebook: A Patient-Focused Approach, 7th edition. New York: McGrawHill, 2007.

# Pharmacotherapy Handbook (6th edition. 2006) Wells, Barbara G.; DiPiro, Joseph T.; Schwinghammer, Terry L.; Hamilton, Cindy W. McGrawHill, 2006.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course** | **System** | | **Subjects** | **Hours** | **Lecturer** |
| **Therapeutic I** | 1- | **Respiratory Disease** |  |  |  |
|  | | Introduction to clinical pharmacy | **4** | Dr. Manhal Ahemd Abdulkader |
| Acid base disorders | **2** | Dr. Manhal Ahemd Abdulkader |
| Asthma | **2** | Dr. Manhal Ahemd Abdulkader |
| COPD | **2** | Dr. Manhal Ahemd Abdulkader |
|  |  |  |
| 2- | **GIT** |  |  |  |
|  | | Peptic ulcer Disease PUD | **2** | Dr.Omer Qutaiba Baderaldeen |
| IBD | **2** | Dr.Omer Qutaiba Baderaldeen |
| Nausea and Vomiting | **2** | Dr.Omer Qutaiba Baderaldeen |
| Diarrhea | **2** | Dr.Omer Qutaiba Baderaldeen |
| Constipation | **2** | Dr.Omer Qutaiba Baderaldeen |
| GERD | **2** | Dr.Omer Qutaiba Baderaldeen |
| 3- | **Rheumatoid Disorders** |  |  |  |
|  | | Rheumatoid Arthritis | **2** | Dr. Manhal Ahemd Abdulkader |
| Osteo-Arthritis | **2** | Dr. Manhal Ahemd Abdulkader |
| Gout | **2** | Dr. Manhal Ahemd Abdulkader |
| 4- | **Neurological Disease** |  |  |  |
|  | | Major Depressive Disorders (MDD) | **2** | Dr. Manhal Ahemd Abdulkader |
| Schizophrenia | **2** | Dr. Manhal Ahemd Abdulkader |
| Parkinson Disease | **2** | Dr.Omer Qutaiba Baderaldeen |
| Epilepsy | **2** | Dr.Omer Qutaiba Baderaldeen |
| 5- | **Other Diseases** |  |  |  |
|  | | Burn | **2** | Dr. Ibtesam Salih Abdulrahman |
| Eclampsia | **2** | Dr. Ibtesam Salih Abdulrahman |
| Geriatric Pharmacotherapy | **2** | Dr. Ibtesam Salih Abdulrahman |
| Drug in pregnancy | **2** | Dr. Ibtesam Salih Abdulrahman |
| Skin Disease | **2** | Dr. Ibtesam Salih Abdulrahman |

**The topics theoretical**

### *pharmacy practice  :*

### *PUBLIC HEALTH AND FIRST AID*

|  |  |
| --- | --- |
| **First aid and Public health** | **Theory 30 hours** |

**Students Evaluation Procedure:**

The total marks for public health and first aid is (100) marks per year distributed as follow:

- Mid-Term examination 35marks

- Quizzes examination 5marks

- Final examination 60 marks

**Introduction**

This course is provided to medical students in the 1st semesters for the 4rd year student and it is covered by 2 hour per week. The first aid is designed to provide the most important concepts and principles related to giving the first aid to any person who need it in any time or place and the public health can help the student to better understand the role of community medicine and epidemiology in the control of infectious disease. Topics will include the responsibilities of first aider and how can he give emergency care and treatment of a sick or injured person before more advanced medical assistance and regarding the topics of public heath include the introduction of primary health care and view of most communicable diseases and their vaccination.

**Goal of the Course:**

The goal of the first aid and public health course is to assure that our students obtain a thorough information about giving first aid to any emergent case and to have idea about the most communicable disease in our locality and their vaccination.

**References**

1. John Morly and Christian Sprenger. First aid handbook, 1st edition. New York: UK: HighfieldCompany , 2012.
2. Jones and Bartlett Learning .First aid, CPR, and AEA Advanced ,sixth 10th edition. New York CHURCHILL LIVINGSTONE 2012.
3. Ann Aschengrau and George R. Seage. Essential of epidemiology in public health ,2013.

**The topics : theoretical**

|  |  |  |
| --- | --- | --- |
| S | Topic | Duration/hrs |
| 1 | First aidPhilosophy of first aid, responsibilities of first aider and primary survey in first aidRespiratory emergencesFirst aid of burnBone and joint injuresSpecific injuresManagement of medical emergenciesHeat and cold emergenciesWound first aidDisaster first aidBite and poisoning | 2 1  1  1  1  2  1  1  1  1  2 |
| 2 | Public healthIntroduction to primary health careBreast feedingDiarrheaExpanded program of immunizationEpidemiology of communicable diseasesMeasles , rubellaDiphtheriaCholera .TyphoidBrucellosisViral hepatitisAIDsMumpsPoliomyelitisTetanusTuberculosis | 1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1 |

### *Patient assessment and communication*

### Second semester

### *pharmacokinetics*

|  |  |
| --- | --- |
| **Time (in hours) perweek** | **Theory: 2**  **practical: 3** |

**Students Evaluation Procedure**

Activities & Quizzes 10%

Mid-term exam 20%

Final exam (Comprehensive) 45%

Practical 25%

Total 100%

**Course overview:**

This Basic PK course is provided to Pharmacy students in the 4th year and it covered by 2 hour per week. This course is designed to help students to understand the role of the pharmacist in drug kinetic in the body.

**Course objective:**

The goal of the Basic PK course is to assure that our students obtain a thorough comprehension of the basic principles necessary for developing effective and safe drug.

**References**

1. Principle of pharmacokinetic LaryBaure 2nd edition

**The topics theoretical**

|  |  |  |
| --- | --- | --- |
| Subjects | Hours | |
|  | |  | |
| Introduction | | 2 | |
| Absorption | | 2 | |
| Distribution | | 2 | |
| Plasma protein binding | | 2 | |
| Metabolisum | | 2 | |
| Elimination | | 2 | |
| Clearance | | 2 | |
| linear and non-linear drugs | | 2 | |
| drugs compartment model  IV infusion | | 2  2 | |
|  | |  | |

**Practical Topics**

|  |  |
| --- | --- |
| **Topics** | **Hours** |
| 1. Determination of Pharmacokinetic Parameters | **2** |
| 1. Calibration curve | **3** |
| 1. Testing antacids | **3** |
| 1. Measurement of biopharmaceutical properties | **2** |
| 1. Dissolution (release) testing of aspirin | **3** |
| 1. Testing Laxatives | **3** |

### *toxicology*

|  |  |
| --- | --- |
| **Course hours** | **Theory 30 hours** |
|  | **Practical 15 hours** |

**Evaluation:**

The total marks for general toxicology is 100 points which will be distributed as follows:

* Practical part: 25pts = midterm 15pts and final 10pts.
* Theory part 75pts = midterm 25pts and final 50pts

**Course Description:**

General toxicology course is designed for 4th year-pharmacy student, which covers the major aspects of toxicology, including the main principles underlying the effects of toxic substances (chemical, physical or environmental agents) on living organisms. It also includes the consideration of the history, scope and applications of toxicology, toxic exposure assessment and toxicity testing as well as major types of toxicants. In addition to the abovementioned topics, the course will cover the basic principles of risk assessment of toxic substances in particular chemical substances and management of intoxication cases. This is considered a stepping stone for clinical toxicology course, which will be given for fifth year-students.

**Course goals and learning objectives:**

The students will have comprehensive understanding of all different aspects of toxicology including mechanistic basis of toxic reactions and diseases to be able to understand the main procedures of chemical risk assessment. Also, it helps introduce the students to clinical toxicology course.

**References**

1. **Textbooks**: Casarett and Doull's Toxicology - The Basic Science of Poisons-7th Ed-2008.

Williams LP, Principles of toxicology; Environmental and Industrial applications-2nd ed., 2000.

1. **Lecture notes**: Notes of every lecture will be distributed to the students one day prior to the lecture.
2. **Research papers**: Articles of different topics will be handed over to participants during the lecture.

**The topics theoretical**

|  |  |  |
| --- | --- | --- |
| SUBJECT | Hours | Lecturer |
| Kick-off, orientation of the course. | 1 | Ghazwan Ahmed Mohammed Raouf |
| Introduction: Principles and Mechanisms of Toxicology | 1 | Ghazwan Ahmed Mohammed Raouf |
| Toxicokinetics | 1 | Ghazwan Ahmed Mohammed Raouf |
| Genetic Toxicology | 1 | Ghazwan Ahmed Mohammed Raouf |
| Chemical carcinogenesis | 1 | Ghazwan Ahmed Mohammed Raouf |
| Toxicity Testing | 1 | Ghazwan Ahmed Mohammed Raouf |
| Toxic responses of blood | 2 | Ghazwan Ahmed Mohammed Raouf |
| Hepatotoxicity | 2 | Ghazwan Ahmed Mohammed Raouf |
| Toxic responses of the kidney | 2 | Ghazwan Ahmed Mohammed Raouf |
| Toxic responses of nervous system | 2 | Ghazwan Ahmed Mohammed Raouf |
| **Mid-term Exam** | **90 min** |  |
| Pulmonotoxicity and health effects of air pollutants | 2 | Ghazwan Ahmed Mohammed Raouf |
| Toxic responses of Ocular and Visual System | 1 | Ghazwan Ahmed Mohammed Raouf |
| Gastrointestinal toxicity | 1 | Ghazwan Ahmed Mohammed Raouf |
| Reproductive and developmental toxicology | 2 | Ghazwan Ahmed Mohammed Raouf |
| Toxic responses of endocrine system | 1 | Ghazwan Ahmed Mohammed Raouf |
| Toxicology of food and plants | 2 | Ghazwan Ahmed Mohammed Raouf |
| Ecotoxicity | 1 | Ghazwan Ahmed Mohammed Raouf |
| Occupational toxicology | TBA | Ghazwan Ahmed Mohammed Raouf |
| Risk Assessment | TBA | Ghazwan Ahmed Mohammed Raouf |
| Summary, review and feedback | TBA | Ghazwan Ahmed Mohammed Raouf |
|  |  |  |

### *medicinal chemistry IV*

### *THERAPEUTICS II*

|  |  |
| --- | --- |
| **Course hours** | **Theory (60) hours** |

**Students Evaluation Procedure:**

The total marks for therapeutics is (100) marks per semester distributed as follow**:**

**-** Mid-Term examination **(40)** marks

- Final examination (60) marks

**Introduction:-**

This Therapeutics course is provided to medical students in the 1st and 2nd semesters in the 4th yearand it covered by 4 hours per week. Therapeuticsis designed to providethe most important concepts and principles related to drug management and clinical presentation of human diseases.Therapeutics is an integrated course which combines the patho-physiology andmanagement of diseases with pharmacology, chemistry and pharmacokinetics of drugs and used to treat the diseases as well as the preventive measures. The course is composed of lectures and case discussions.Therapeutics course requires a strong sense of commitment from students and their active attendance for all aspects of the course.Topics will include the basic principles of therapeutics and several major classes of therapeutic agents according to the systematic classification of human diseases, with attention to clinical uses, side effects and prevention.We strongly advice students to take the time to read through this course book, it contains most of the information that they will needs during the academic year.

**Goal of the Course:-**

The goal of the Therapeutics course is to assure that our students obtain a thorough comprehension of the basic therapeutic principles necessary for developing effective and safe therapeutic regimens for their patients.

**References**

1. Pharmacotherapy: A Pathophysiologic Approach, 8th edition  
   Joseph T. DiPiro, Robert L. Talbert, Gary C. Yee, Gary R. Matzke, Barbara G. Wells, L. Michael Posey. 2011.
2. Applied Therapeutics\_The\_Clinical Use Of Drugs (9th\_Ed.\_2009).

Pharmacotherapy Casebook: A Patient-Focused Approach, 7th edition. New York: McGrawHill, 2007.

**The topics: theoretical**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course** | **System** | | **Subjects** | **Hours** | **Lecturer** |
| **Therapeutic II** | 1- | **Cardiovascular Disease** | Hypertension | **4** | Dr. Hishyar Mohammed Salih |
|  | | Dyslipidemias | **2** | Dr. Hishyar Mohammed Salih |
| Ischemic Heart Disease ( Angina) | **2** | Dr. Hishyar Mohammed Salih |
| Ischemic Heart Disease ( MI) | **2** | Dr. Hishyar Mohammed Salih |
| Arrythmias | **2** | Dr. Hishyar Mohammed Salih |
| Stroke | **2** | Dr. Hishyar Mohammed Salih |
| Heart failure | **2** | Dr. Hishyar Mohammed Salih |
| Shock | **2** | Dr. Hishyar Mohammed Salih |
|  |  |  |
| 2- | **Hematological Disorders** | Anemias | **2** | Dr. Hishyar Mohammed Salih |
|  | | Steam cell Transplant | **2** | Dr. Hishyar Mohammed Salih |
| Coagulation Disorders | **2** | Dr. Hishyar Mohammed Salih |
|  |  |  |
| 3- | **Oncologic Disorders** | Cancer treatment and chemotherapy | **4** | Dr. Manhal Ahemd Abdulkader |
|  | | Breast cancer | **2** | Dr. Manhal Ahemd Abdulkader |
| lung cancer | **2** | Dr. Manhal Ahemd Abdulkader |
| Colorectal cancer | **2** | Dr. Manhal Ahemd Abdulkader |
| Prostate cancer | **2** | Dr. Manhal Ahemd Abdulkader |
| lymphomas | **2** | Dr. Manhal Ahemd Abdulkader |
| leukemia | **2** | Dr. Manhal Ahemd Abdulkader |
|  |  |  |

### *pharmacy practice Ш*

### *pharmacy management and administrate*

### *Community Pharmacy , low and ethics*

|  |  |
| --- | --- |
| **Course hours** | **Theory (25) hours** |

**Students Evaluation Procedure:**

The total marks for Community Pharmacy is (100) marks per semester distributed as follow**:**

**-** Midterm examination **(**40**)** marks

- Final examination (60) marks

**Introduction:**

This community pharmacy course is provided toPharmacy students in the 4th yearand it covered by 2 hour per week. This course is designed to help students understand the vital role of the pharmacist in community pharmacy.Community Pharmacy course requires a strong sense of commitment from students and their active attendance for all aspects of the course.

**Goal of the Course:**

The goal of the community pharmacy course is to assure that our students obtain a thorough comprehension of the basic principles necessary for developing effective and safe therapeutic dispensing of over-the-counter (OTC) medications for the patients.

References

1. **Community Pharmacy: Symptoms, Diagnosis and Treatment. 3rd edition, UK, Churchill Livingstone, 2013.**
2. Symptoms in the Pharmacy: A Guide to the Management of Common Illness. 6th edition Blackwell Publishing Ltd, 2009

**the topics :theoretical**

|  |  |  |  |
| --- | --- | --- | --- |
| **S** |  | **Hours** | |
|  |  | |  | |
| **1** | **Introduction** | | 1 | |
| **2** | **Gastroenterology** | | **5** | |
| **3** | **Respiratory system** | | **3** | |
| **4** | **Ophtalmology** | | **2** | |
| **5** | **Ear conditions** | | **2** | |
| **6** | **Dermatology** | | **2** | |
| **7** | **Pediatrics** | | **2** | |
| **8** | **Women’s health** | | **2** | |
| **9** | **Headache** | | **2** | |
| **10** | **دور الصيدلاني في التعامل مع الكادر الطبي و المرضى و المجتمع** | | **2** | |
| **11** | **قانون نقابة الصيادلة (الحقوق و الواجبات)** | | **2** | |

fifth year (semester program)

### first semester

### *industrial pharmacy*

|  |  |
| --- | --- |
| **Time (in hours) per week** | **Theory: 3**  **Practical: 3** |

**Assessment scheme**

The exams are achieved in a written paper format. Question papers are written and reviewed by lecturers. Answer books are corrected and marked by the same lecturer. The total marks are 100 marks per semester distributed as follow:

- Written theoretical midterm examination (25) marks

- Written practical midterm examination (10) marks

- Written theoretical final term examination (50) marks

- Written practical finalterm examination (10) marks

- Daily attendance, activities and quizzes (5) marks

**Course overview:**

The industrial pharmacy course is provided to pharmacy students in the 1st and 2nd semesters in the 5th year and it covered by three theoretical and three practical hours per week. This course is designed to introduce pharmacy students to the designing, preparation, compounding, manufacturing, packaging and evaluation of different dosage forms with respect to the machines used, types of machines, mechanisms by which these machines works, raw materials, compositions, method of preparation, stability, storage and uses. In the practice part of this course the student will learn different techniques used for preparation and manufacturing these dosage forms in laboratory scale.Industrial pharmacy course requires a strong sense of commitment from students and their active attendance for all aspects of the course.

**Course objective:**

The goal of the Industrial pharmacy course is to introduce pharmacy students to the principles, practices, and technologies applied in the preparation of pharmaceutical dosage forms and drug delivery systems in large scale in factories. Regulations and standards governing the manufacturing and compounding of pharmaceuticals are also presented.

**References**

1. Coben L.J., Lieberman H.A. (2009). Suppositories. In: Lachman L., Lieberman H.A. editor. The Theory and Practice of Industrial Pharmacy. Special India ed. India. CBS
2. Aulton’s. Pharmaceutics: The Design and Manufacture of Medicines, 3rd edition. Edinburgh CHURCHILL LIVINGSTONE, 2007.
3. Remington. The Science and Practice of Pharmacy, 20th edition. Maryland: Lippincott Williams & Wilkins, 2000.
4. Ansel’s. Pharmaceutical Dosage Forms and Drug Delivery Systems, 9th edition. Philadelphia: Wolters Kluwer Health, 2011

**The Topics:** theoretical

1. Mixing 6 hrs
2. Milling 3 hrs
3. Drying 3 hrs
4. Filtration and Clarification 3 hrs
5. Pre-formulation Studies 4 hrs
6. Liquid dosage form 3 hrs
7. Suspension 5 hrs
8. Emulsion 5 hrs
9. Semisolid 6 hrs
10. Suppositories 4 hrs
11. Inhalation 3 hrs

### *clinical TOXICOLOGY:*

|  |  |  |
| --- | --- | --- |
| **Time** | **Theory** | **Practical** |
| **30 hours** | **15 hours** |

**Students Evaluation Procedure:**

The course consists of 30 hours of lectures and 15 hours of practice.

The total marks are 100 points which distrusted as follows:

1. Mid-term exam 25 points
2. Reports 5 points.
3. Practical part 20 points.
4. Final examination 50 points.

**Introduction:-**

This course is designed for fifth year-pharmacy students. It covers the clinical aspects of toxicology, including diagnostic tools and methods, clinically most important poisonings, causes of poisoning, and interpretation of symptoms and signs. It also includes the effective utilization of laboratory data and results in order to provide the most appropriate treatments and clinical approaches. Specific information on management and treatment protocols is given during the course.

**Goal of the Course:-**

The main objective of the course is to provide broad knowledge regarding the clinical aspects and major principles of pharmacotherapy, including therapeutic drug monitoring and emergency toxicology, related to the intoxication. The course helps students to interpret the data obtained from analytical laboratory to effectively use them for treatment of intoxicated patients.

**References:**

1. Frank A. Barile, 2005, Clinical toxicology; principles and mechanisms, Taylor & Francis-Library, New York.
2. Casarett and Doull's Toxicology - The Basic Science of Poisons-7th Ed-2008.
3. Williams LP, Principles of toxicology; Environmental and Industrial applications-2nd ed., 2000.
4. Lecture notes: soft-copies of lectures are provided after every lecture.
5. Scientific articles: every student is given a number of articles to read and write a report on given topic.

**The topics :**

1. **Theory**

|  |  |  |
| --- | --- | --- |
| S | Topic | Duration/hrs |
| 1 | Kick off- orientation of the course | 1 |
| 2 | General principles of treatment of intoxication | 2 |
| 3 | Kinetics in intoxication | 1 |
| 4 | Intoxication of cardiocascular drugs | 1 |
| 5 | Metal intoxication | 1 |
| 6 | Intoxication of analgesics | 2 |
| 7 | Alcohol intoxication | 2 |
| 8 | Intoxication of pesticides | 2 |
| 9 | Carbon monoxide, cyanide, and sulfides | 1 |
| 10 | Intoxication caused by sedatives and drugs of psychiatric and epilepsy | 2 |
| 11 | Intensive care of patients with intoxication | 2 |
| 12 | Antidotes; uses, application, and development | 2 |
| 13 | Toxicology of the battlefield and chemical warfare agents | 2 |
| 14 | Chemical accidents and epidemic intoxications | 2 |
| 15 | Introduction of drug safety | 1 |
| 16 | Risk benefits assessment | 1 |
| 17 | Clinical significance of drug – drug interactions | 2 |
| 18 | Narcotic and drugs of abuse-intoxication, management and treatments | 1 |
| 19 | Development of new drugs | 2 |

1. **Practical part**

|  |  |  |  |
| --- | --- | --- | --- |
| S | Topics | Hours | Lecturer |
| 1 | Introduction to laboratory toxicology | 2 | Ghazwan Ahmed Mohammed Raouf |
| 2 | Introduction to diagnostic tools and analytical methods | 2 | Ghazwan Ahmed Mohammed Raouf |
| 3 | Demonstration 1: diagnostic tools in the hospital of Azadi. (hematological, virological, bacteriological parameters) | 2 | Ghazwan Ahmed Mohammed Raouf |
| 4 | Demonstration 2: Hospital toxicity testings at the laboratory department. Principles of diagnostic machines and tools. | 2 | Ghazwan Ahmed Mohammed Raouf |
| 5 | Calculations of alcohol intoxication | 2 | Ghazwan Ahmed Mohammed Raouf |
| 6 | Demonstration on dialysis and hemoperfusion | 2 | Ghazwan Ahmed Mohammed Raouf |
| 7 | Dialysis center: Reports on cases of renal failure induced by drugs and other factors. | 2 | Ghazwan Ahmed Mohammed Raouf |
| 8 | Aspirin absorption and role of charcoal: experimental investigation | 2 | Ghazwan Ahmed Mohammed Raouf |
| 9 | Hospital Azadi: polypharmacy, report on cases of potential intoxication developed by multiple drugs | 2 | Ghazwan Ahmed Mohammed Raouf |
| 10 | Cases on analgesic intoxications/OTC drugs | 2 | Ghazwan Ahmed Mohammed Raouf |
| 11 | Cases on adulterated foods intoxication | 2 | Ghazwan Ahmed Mohammed Raouf |
| 12 | Demonstration: emergency hospital. Gastric decontamination. | 2 | Ghazwan Ahmed Mohammed Raouf |
| 13 | Mathematical determination of LD50 and its clinical significance in terms of toxicology | 2 | Ghazwan Ahmed Mohammed Raouf |
| 14 | Case reports on CVS intoxications | 2 | Ghazwan Ahmed Mohammed Raouf |
| 15 | Case reports on Alcohol intoxications | 2 | Ghazwan Ahmed Mohammed Raouf |

### *clinical biochemistry*

### *therapeutics Ш*

|  |  |
| --- | --- |
| **Time** | **Theory 45 hours** |

**Students Evaluation Procedure:**

The total marks for therapeutics is (100) marks per semester distributed as follow**:**

**-** Mid-Term examination40 marks

- Final examination 60 marks

**Introduction:**

This Therapeutics course is provided to medical students in the 1st semester of the 5th year and it covered by 4 hours per week. Therapeutics is designed to provide the most important concepts and principles related to drug management and clinical presentation of human diseases.Therapeutics is an integrated course which combines the patho-physiology and management of diseases with pharmacology and pharmacokinetics of drugs and used to treat the diseases as well as the preventive measures. The course is composed of lectures and case discussions. Therapeutics course requires a strong sense of commitment from students and their active attendance for all aspects of the course.Topics will include the basic principles of therapeutics and several major classes of therapeutic agents according to the systematic classification of human diseases, with attention to clinical uses of drugs, side effects and prevention.We strongly advice students to take the time to read through this course book, it contains most of the information that they will needs during the academic year.

**Goal of the Course:**

The goal of the Therapeutics course is to assure that our students obtain a thorough comprehension of the basic therapeutic principles necessary for developing effective and safe therapeutic regimens for their patients. It also aims to help students acquire insights in the basic principles of rational pharmacotherapy and to promote the communication with classmates and (future) pharmacists.

Note: Rational pharmacotherapy, which is defined as the selection and use of drugs based on effectiveness, safety, convenience, and economics.

**References**

# Pharmacotherapy: A Pathophysiologic Approach, 8th edition Joseph T. DiPiro, Robert L. Talbert, Gary C. Yee, Gary R. Matzke, Barbara G. Wells, L. Michael Posey. 2011.

# Applied Therapeutics\_The\_Clinical Use Of Drugs (9th\_Ed.\_2009).

# Pharmacotherapy Casebook: A Patient-Focused Approach, 7th edition. New York: McGrawHill, 2007.

# Pharmacotherapy Handbook (6th edition. 2006) Wells, Barbara G.; DiPiro, Joseph T.; Schwinghammer, Terry L.; Hamilton, Cindy W. McGrawHill, 2006.

**The topics theoretical**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course** | **System** | | **Subjects** | **Hours** | **Lecturer** |
| **Therapeutic III** | 1- | **Infectious Disease** | Introduction to infectious diseases | **4** | Dr. Muayad Aghali Merza |
|  | | LRTI-Bronchitis | **2** | Dr. Muayad Aghali Merza |
| LRTI-Pneumonia | **2** | Dr. Muayad Aghali Merza |
| Urinary Tract Infection (UTIs) | **2** | Dr. Muayad Aghali Merza |
| Sexually Transmitted Diseases (STD) | **2** | Dr. Muayad Aghali Merza |
| TB | **2** | Dr. Muayad Aghali Merza |
| HIV AIDS | **2** | Dr. Muayad Aghali Merza |
| Influenza | **2** | Dr. Muayad Aghali Merza |
| Antimicrobial Prophylaxis in Surgery | **2** | Dr. Muayad Aghali Merza |
| Fungal Infection | **2** | Dr. Muayad Aghali Merza |
|  |  |  |
| 2- | **Endocrine Disorders** | Diabetes Mellitus Type I | **2** | Dr.Omer Qutaiba Baderaldeen |
|  | | Diabetes Mellitus Type II | **2** | Dr.Omer Qutaiba Baderaldeen |
| Disorders of pituitary glands | **2** | Dr.Omer Qutaiba Baderaldeen |
| Disorders of Adrinal glands | **2** | Dr. Manhal Ahemd Abdulkader |
| Thyroid Disorders | **2** | Dr. Manhal Ahemd Abdulkader |
|  |  |  |
| 3- | **Renal Disorders** | Acute Renal Failure (ARF) | **2** | Dr. Manhal Ahemd Abdulkader |
|  | | Chronic Renal Failure (CRF) | **2** | Dr. Manhal Ahemd Abdulkader |
| Disorder of sodium & Water hemostatis | **2** | Dr. Manhal Ahemd Abdulkader |
| Drug induced kidney diseases | **2** | Dr. Manhal Ahemd Abdulkader |
|  |  |  |

### *clinical pharmacy (case study)*

### *graduation research project*

### second semester

### *industrial pharmacy*

|  |  |
| --- | --- |
| **Time (in hours) per week** | **Theory: 3**  **Practical: 3** |

**Assessment scheme**

The exams are achieved in a written paper format. Question papers are written and reviewed by lecturers. Answer books are corrected and marked by the same lecturer. The total marks are 100 marks per semester distributed as follow:

- Written theoretical midterm examination (25) marks

- Written practical midterm examination (10) marks

- Written theoretical final term examination (50) marks

- Written practical finalterm examination (10) marks

- Daily attendance, activities and quizzes (5) marks

**Course overview:**

The industrial pharmacy course is provided to pharmacy students in the 1st and 2nd semesters in the 5th year and it covered by three theoretical and three practical hours per week. This course is designed to introduce pharmacy students to the designing, preparation, compounding, manufacturing, packaging and evaluation of different dosage forms with respect to the machines used, types of machines, mechanisms by which these machines works, raw materials, compositions, method of preparation, stability, storage and uses. In the practice part of this course the student will learn different techniques used for preparation and manufacturing these dosage forms in laboratory scale.Industrial pharmacy course requires a strong sense of commitment from students and their active attendance for all aspects of the course.

**Course objective:**

The goal of the Industrial pharmacy course is to introduce pharmacy students to the principles, practices, and technologies applied in the preparation of pharmaceutical dosage forms and drug delivery systems in large scale in factories. Regulations and standards governing the manufacturing and compounding of pharmaceuticals are also presented.

**References**

1. Coben L.J., Lieberman H.A. (2009). Suppositories. In: Lachman L., Lieberman H.A. editor. The Theory and Practice of Industrial Pharmacy. Special India ed. India. CBS
2. Aulton’s. Pharmaceutics: The Design and Manufacture of Medicines, 3rd edition. Edinburgh CHURCHILL LIVINGSTONE, 2007.
3. Remington. The Science and Practice of Pharmacy, 20th edition. Maryland: Lippincott Williams & Wilkins, 2000.
4. Ansel’s. Pharmaceutical Dosage Forms and Drug Delivery Systems, 9th edition. Philadelphia: Wolters Kluwer Health, 2011

**The Topics:** theoretical

1. Sterilization 3 hrs
2. Parentral dosage forms 9 hrs
3. Tablet dosage forms 12 hrs
4. Sustained release dosage forms 6 hrs
5. Capsule dosage forms 6 hrs
6. Packaging 4 hrs
7. Processing 4 hrs
8. Quality control 4 hrs

### *clinical pharmacokinetics*

|  |  |
| --- | --- |
| **Time (in hours)** | **Theory: 3** |

**Students Evaluation Procedure**

Activities & Quizzes 10%

Mid-term exam 20%

Final exam (Comprehensive) 70%

Total 100%

**Course overview:**

This Clincal PK course is provided to Pharmacy students in the 5th year and it covered by 3 hour per week. This course is designed to help students to understand the role of the pharmacist in drug kinetic in the body.

**Course objective:**

The goal of the Clinical PK course is to assure that our students obtain a thorough comprehension of the basic principles necessary for developing effective and safe drug.

**References**

Principle of Clinical pharmacokinetic ,LaryBaure ,2nd edition

**The topics theoretical**

|  |  |  |
| --- | --- | --- |
| Subjects | Hours | |
| Introduction | | 2 | |
| ADME | | 2 | |
| Bioavailability | | 2 | |
| T1/2, Ke, CL | | 2 | |
| VD, Loading dose  Pediatric PK | | 2  2 | |
| Dose interpretation | | 2 | |
| Aminoglycoside PK | | 2 | |
| Vancomycin PK | | 2 | |
| AED PK  Cyclosporin PK  Lithium PK  Digoxin PK  Theophylin PK  Methotrexate PK  IV infusion | | 2  2  2  2  2  2 | |

### *Pharmaceutical instrumental analysis*

|  |  |
| --- | --- |
| **Time (in hours) perweek** | **Theory: 2hs.**  **Practical:2hs.** |

* **Assessmentscheme**

1- Theory (25 0)

* 3-4 short Quizzes .
* Home works .
* 1-2 written monthly examinations .
* Final examination (40 0).

2- Practical : ( 15 0):

* 4 short Quizzes .
* Home work .
* 2 written examination ( practical ).
* Final examination ( 200).

**Courseoverview:**

1. The course also introduces spectroscopic techniques for qualitative and quantitative chemical analysis. Provide an understanding of the major instruments techniques used in the chemical analysis including the principle, design and the application of each technique.
2. Give a general overview of variability in experimental data and cover simple statistical procedures for analyzing the data.

**Courseobjective:**

The major aims of this course are to enable students to:

Obtain a strong foundation in chemical analysis, Describe concepts and principles used in analytical chemistry, Develop skills to solve problems in quantitative chemical analysis based on chemical principles.

**References**

**1**-Elementary Quantitative Analysis Theory and Practice By W. J. Blaedel and V. W. Meloche.

2-Analytical Chemistry By Gary D. Christian.

3-Text Book of Quantitative Inorganic Analysis .By A. L .Vogel.

4-Quantitative Analysis By R. A. Day, A. L. Underwood.

5- Elementary Quantitative Analysis Theory and Practice By W. J. Blaedel and V. W. Meloche.

**The topics theoretical**

1.Instrumental analysis (2 hours)   
— Introduction to chemical instrumentation.   
— Using of instruments for analysis. Steps of analysis.  
— Basic principles of instrumentation. .   
— Classification of instrumental analysis:

2. Instrumental methods

U. v analysis

Introduction

Spectrophotometry

Ultraviolet-Visible (UV/Vis) spectroscopy:

determination of solutions of transition metal ions and highly conjugated organic compounds .

Applications of Ultraviolet/Visible Molecular Absorption Spectrophotometry

Woodward Feiserrules for organic analysis

Application of U.V spectrophotometry.in different PH

Mass spectrometry (MS):

Molecular mass and formula and structure information .

Introduction

MS for Biomedical Applications

Types of Mass Analyzers

*Patterns of different organic compounds’ fragmentation*

*Hyphenated Mass Techniques*

Hyphenated GC-MS

Hyphenated LC-MS

Nuclear magnetic resonance (NMR) spectroscopy:

Map of carbon-hydrogen framework .

Infrared (IR) spectroscopy:

Functional groups .

**Practical Topics**

Concentrations and preparation.

1. Beer’s Law and It’s Implications for Instrument Construction.(determination of λmax)
2. Calibration methods. [Spectrophotometric Analysis of Co(NO3)2  ].
3. Spectrophotometric Analysis of Aspirin.
4. Spectrophotometric analysis of a mixture of Caffeine and benzoic acid in a soft drink.
5. Continuous-variation method(1,2,&3).
6. Job's Method of Continuous Variation (1)
7. Chemical methods for Chlortetracycline ,Oxytetracycline , and tetracycline
8. Ferric chlortetracycline colorimetric methods for Chlortetracycline ,Oxytetracycline , and tetracycline.
9. Acid colorimetric method for chlortetracycline or tetracycline .

Base colorimetric method.

### *Hospital training (words)*

### *Hospital training (clinical lab)*

### *Cosmetics*

|  |  |
| --- | --- |
| **Time (in hours) perweek** | **Theory: one hour** |

**Assessmentscheme**

The grades scheme( for subject has theoretical parts )will be as the table below:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Midterm –mid semester exams | Final semester exams | Total |
| Theory | 40 | 60 | 100 |

**Courseoverview:**

Each pharmacy one part of it related to the cosmetics for example shampoo creams and sun screens on it’s different types so it’s very important for the pharmacist to know what is cosmetic and what is the active ingredients of each cosmetics and were should the person use it and how to apply it because cosmetics is regarded as OTC drugs, all of this things will learn it from the cosmetics, the students will take benefit from it for the future work in the pharmacy. The principle of this course it is only theory subject and of different lectures title only there is theory examination .only fifth stage took it at second course .

**Courseobjective:**

At the end of this course the students should know

1. What is cosmetics?
2. Types of skin
3. Effect of sun on the skin
4. What is sunscreen and after sun exposure creams
5. Type of hair and different types of shampoo
6. Type of makeup and how to apply it.

**References**

1. Marc Paye,André O. Barel, and Howard I. Maibach (2006). Hand Book of Cosmetic Science and Technology 2nd edition USA.
2. André O. Barel Marc Paye, and Howard I. Maibach (2009). Hand Book of Cosmetic Science and Technology 3rd edition USA.

**TheTopics:** theoretical

|  |  |
| --- | --- |
|  | Hours |
| * Introduction to cosmetic. Skin structure and function. * Chemical peels. * Sun protection and sun screen. * Dry skin cause of dry skin care for dry skin treatment for dry skin * Aging skin and dermal fillers * Skin whitening * Hair structure and function hair loose oily hair and dry hair * Shampoo formulation type of shampoo hair gel hair mousses and hair spray | 4  2  2  **4**  4  2  2  2 |

### *Pro-drugs*