مناهج ومفردات كلية الطب/ فرع الكيمياء الحياتية

السنة الاولى / الكيمياء الطبية

Inorganic and analytical Chemistry (15 hours)

A. Analytical

1. **Acids, bases and salt of medical interests**
2. **The International system of units (S I U)**
3. **The pH concept, acid-base balance**
4. **Solutions and methods of expressing concentrations**
5. **Buffers and buffer systems of physiological importance**
6. **Colloidal Chemistry and biological systems, Dialysis and living systems.**
7. **Chelation and possible applications in medicine**
8. **Ions in living system and: their importance**

B. Inorganic

1. **Radioactivity and medical uses of radioactive isotopes**
    a. **Natural radioactivity : a-Alpha particles, b-Beta particles, c-Gamma particle d-positron emission e-Properties of Alph, Beta, Gamma radiation**
2. **Writing a balanced nuclear equation: Alpha &Beta decay & Gamma production**
3. **Properties of radioisotopes: a-Nuclear structure and stability, b-Half-life**
4. **Medical application of radioactivity**
    a. **a-cancer therapy using radiation**
    b. **b-making isotopes for medical applications**
5. **Biological effects of radiation**
6. **Chelation and possible application in medicine**
7. **Ions in living system and their importance**
8. **Colloidal chemistry and biological systems, Dialysis and living systems.**

Organic Chemistry (15 hours)

1. **Isomerism, stereoisomerisum chirality (optical isomerism and geometrical isomerism). A relationship to medical activity of organic compounds and living system.**
2. **Stereochemistry at cyclic systems (steroids)**

3. **Alcohols (Oxidation and toxicity to (human)**
4. **The chemistry of carbonyl compounds (aldelydes & ketones)**
5. **Carboxylic acids and some of their derivatives (urea, amides, esters ….. etc)**
6. **Alkaloids and heterocylic compounds**
7. **Pollution.**

Includes:

- **Gases used in chemical warfare.**
- **Pollution due to hospitals and industrial wastes.**
- **Physiological effects of chemical materials on living system.**
- **Hydrocarbons pollution.**

Biochemistry (30 hours)

1. **Carbohydrates (6 hours)**
   - **Definition , Classification and chemistry (reactions)**

The three dimensional structures of monosaccharidas.

The cyclic structures of monosaccharides. α &β isomers , mutarotation

Disaccharides , polysaccharides Storage and structural ,
Hetropolysaccharides
Mucopolysaccharides and connective tissues, glycoprotein

Biological importance of carbohydrates

2. **Lipids (4 hours)**

Classification, of fatty acids

Biological roles of lipids

Fatty acids, physical properties classification and reactions

Eicosanoids : Prostaglandins, thromboxanes and leukotrienes

Phospholipids, Steroids,

3. Proteins and amino acids (6 hours)

Classification

Reactions of amino acids

Biological activity of peptides

Determination of amino acids sequences of polypeptides

Structural levels of proteins

Globular and fibrous proteins

Cellulare function of proteins

Denaturation of proteins

4. Nucleic Acids (4 hours)

The chemical structure of nucleic acid.

Complementary base pairing

The types of nucleic acids

The types of DNA damage

The nucleic acid analog

Biomedical importance of nucleic acid

Biochemical functions of nucleic acid

5. Enzymes (6 hours)

Definition of enzymes, substrate and active site
Biomedical Importance
General properties of enzymatic reactions
Theories of enzyme substrate binding:
A: Key – Lock theory
B: Induced – Fit theory
Enzyme Nomenclature
Enzyme Classes:
Class 1: Oxidoreductases
Class 2: Transferases

Class 3: Hydrolases
Class 4: Lyases
Class 5: Isomerases
Class 6: Ligases

Coenzymes including definition, types and classification

Factors affecting enzyme activity:

A: Substrate concentration

B: Enzyme concentration

C: Temperature

D: pH

E: Activators and inhibitors

First and zero order kinetics

Measurement of enzyme activity.

Enzyme assay.

Types of enzyme inhibition:

A: Reversible inhibition:

1.Competitive inhibition

2. Non-competitive inhibition

B: Irreversible inhibition