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| **Basic Analytical chemistry** | |
| 1202 Chm | Course No |
| General Chemistry | Prerequisite |

**Aims and Objectives:**

The Course involves the application of various laboratory methods for determining composition of samples,

both qualitatively and quantitatively. These topics provide the student with the knowledge and skills required to

understand the aspects of analytical chemistry which are essential for the medical laboratory technician.

On successful completion of the course, the student will have a sound knowledge of the terms, definitions,

principles and techniques of analytical chemistry.

**Syllabus:**

The Course comprises the following topics:

**Types of chemical analysis:**

         Methods and Choice of analytical procedure.

         Qualitative chemical analytical application.

         Quantative chemical analysis – volumetric, gravimetric

         Instrumental and their applications.

**Solution Properties:**

**\*** Weak and strong electrolytes. Acid and bases. Atomic and molecular weights. .

The pH concept, pH calculations for acids, bases, salt solutions. Buffer solutions, definition,

buffer capacity, pH calculation, uses. Acid-base titration, indicators, standard solutions.

**Redox reactions:**

Redox reaction: definition, oxidants and reductions. Potassium permanganate

**Solubility, precipitation, Chelation:**

         Solubility and solubility products products. Factors after affecting solubility.

         Precipitation reactions- practical applications.

         Complex ions. Chelation. Stability constants. Direct and back EDTA titration.

A specially selected range of topics taken forms the basis for practical sessions, in which students learn

to follow written experimental instructions to carry out a number of analytical procedures and write reports on their work.

**Plane Academic**

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| **Time** | **Lecture** | **Weak** |
| 1:30 | Analytical Chemistry**,** Analytical Chemistry and Other Fields    Comparing Between Qualitative Analysis and Quantitative Analysis,  Analysis Steps, | First weak |
| 2 | Volumetric Analysis,equivalence point and end point, determine the end point, Standard solutions, Conditions ofprimary standards , Classification of volumetric methods,  Acid- Base-Precipitation-Complex metric-Reduction-Oxidation  Conditions of the titration reaction, Types of titration-Directtitration-Indirect titration (Back titration), Titration curve | Second week |
| 2 | Problem solution( Concentration ) physical method  (g/l, ppm, ppb, weight percentage %w/w, volume percentage %v/v, weight –volume percentage %w/v)  chemical method( mole, molarity, molality, molecular weight, normality, equivalent weight) | Third week |
| 1 | First mid exam | Fourth week |
| 2 | Arrhenius-Bronsted-Lowry -LewisTheory of Acid-Base, Acid- Base Equilibria in Water,  pH Calculation for Aqueous Solution, (strong and weak acid and base), Blood pH, buffer solutions, buffer capacity, the buffering mechanism, physiological buffers. | Fifth week |
| 2 | Problem of pH | Sixth week |
| 2 | Neutral titration, Introduction ,Titrating a strong acid with a strong base and vice versa, Titrating  a weak acid with a strong base and vice versa, The importance of indicator used in equilibrium titrations. | Seventh week |
| 1 | Second mid exam | Eighth week |
| 2 | Precipitation, Introduction, Titration curve, methods of precipitation titration, (Mohr's-Volherd's- Fajan's), Important note on these methods. | Ninth week |
| 2 | Gravimetric analysis ,I ntroduction, Gravimetric analysis is done for substances by one of the following methods  1- Direct weighting – 2- Decrease of weight method- 3- chemical precipitation method. Comparing Between the electro  Deposition and chemical precipitation, Gravimetric analysis steps, needs for Gravimetric analysis | Tenth week |

**First mid exam**            15

**Second mid exam**        15

**Practice lab**                  30

**Final exam**                40

**Total**                           100