(BM-210) - Biochemistry

Course Outline:

Theory:

1. **Introduction to Biochemistry**
    1. Colloidal state, buffer, pH, significance of pH Henderson equation, surface tension, viscosity, osmosis, diffusion, Biological Membrane, active Transport, Chemi-osmotic theory-passive transport concept of chromatographic techniques (TLC, paper chromatography, GLC column chromatography etc.) carbohydrates, amino acids, nucleic acids, proteins, vitamins, enzymes, hormones & signaling agents.
2. **Metabolism of Carbohydrates, Lipids and Proteins**
    1. Carbohydrate Amino acids: structure, and properties. Proteins: primary and secondary structure of proteins. *Enzymes:* Nomenclature, properties, Working, Factors affecting Reaction, Equation and diseases Globular proteins: heme-proteins, hormones & signaling agents.
3. **Conformational analysis and forces**
    1. Conformational analysis and forces that determine protein and nucleic acid structure. Molecular Modeling of protein, nucleic Tertiary and quarterly structure of protein, protein mis- folding.
4. **Carbohydrates**
    1. Introduction, classification and structure. Digestion of carbohydrates. Metabolism of carbohydrates: glycolysis, regulation of metabolism, Overview and reactions of glycolysis, hormonal regulation of glycolysis, Tricarboxylic acid cycle, reactions of TCA, energy and regulation of TCA cycle.
5. **Bioenergetics**
    1. *Bioenergetics:* Thermodynamic principles in human body. Thermodynamics of phosphate compounds (phosphate transfer reactions) and role of ATP for biological energy transfer, thermodynamics of life
6. **Metabolism of Lipids**
    1. Digestion, absorption and secretion. Utilization of dietary lipids
7. **Vitamins**
    1. folic acid, VitaminB12, Vitamin C, Vitamin D, Vitamin B1, Vitamin A, Vitamin E.

List of Practicals:

1. How to prepare the Solution in Lab
2. Determination of pH by pH meter and Litmus paper
3. Demonstration the action of buffer
4. To determine the principle application of Hander son- Haselbash's equation
5. Tests for proteins
6. Examination of Egg white
7. Color reactions for proteins
8. Isolation of Casein from milk
9. Tests on carbohydrates
10. Measurement of Blood Glucose level with help of spectrophotometer
11. Oral Glucose Tolerance Test (OGTT)
12. Tests of Lipid profile by chemical analyzer
13. Separation of Amino Acids by chromatographic methods.
14. Open ended lab I
15. Open ended lab II
16. Open ended lab III

Suggested Teaching Methodology:

- Lecturing

- Written Assignments Report Writing

Suggested Assessment:

Theory (100%)

- Sessional (20%)
- Quiz (12%)
- Assignment (8%)
- Midterm (30%)
- Final Term (50%)

Laboratory (100%)

Text and Reference Books:

1. Lippincott, Bio-Chemistry 5th Ed,2010 Donald Voet, Judith, G. Voel and Charlotte, W. Prats,
2. Fundamentals of Biochemistry, 2006, John Wiley & Sons. Rodney Boyer,
3. Modern Experimental Biochemistry, Pearsons Education, Delhi, India. Tsai. C. Stan,