SYLLABUS

1. Chemistry of Life.
2. Inheritance of in Life.
3. Molecular basis of Inheritance.
4. Biological Diversity and evolution.
5. Case studies.

- Chemistry of Life
  - Elements of life and their bonding ability
  - Intro to biomolecules.
  - Effect of pH on biological system.
  - Bioenergetics - Glycosis.

- Inheritance in Life
  - Early ideas of heredity
  - Mendelian genetics.
  - Chromosomes and cell division.
  - Genetic disorder
  - Chromosomal theory of Inheritance.

- Molecular Basis of Inheritance.
  - Discovery of DNA.
  - Messelson and Stahl experiment, DNA replication
  - Mechanism of Replication
  - Mutations - addition, deletion, substitution.
  - Protein synthesis
  - Post transcriptional modification.
  - General characteristics of genetic code.
  - Translation - initiation, elongation,

- Biological diversity and evolution.
  - Origin of life and evolution
  - Form and function
  - Modularity and incremental change
  - Symbiosis - Mutualism, commensalism, parasitism, coevolution, communal living
  - Biological control systems.
  - Bioinspiration and biomemetics

- Case Studies.
  - Vaccination
  - Viral replication
  - Cloning
  - Lac-Operon - Gene regulation.
  - Mutation
  - Sickle cell anemia
  - Ascent of sap.

Chemistry of Life

ELEMENTS IN THE HUMAN BODY

O, C, N, H, ⟶ 96.3%
Ca, P, K, S, Na, Cl, Mg ⟶ 3.7%
Trace elements <0.01% (B, Cr, Co, Cu, F, I, Fe, Mn, Mo, Se, Si, Sn, V, Zn)

Atomic No = no of proton
Mass No = no of proton + neutrons.
Outermost e^- interact during reactions.

- Covalent Bond is the sharing of a pair of valence e^- by two atoms.
- The attraction of a particular atom for the e^- of a covalent bond is called electronegativity.
- When electrons of the bond are shared equally (less electronegativity difference) it is called a non polar covalent bond.
- When electrons of the bond are not shared equally (attracted towards more electronegative atom), due to high electronegativity difference, it is called a polar covalent bond. eg H_2O

- Ionic Bond - The attraction between oppositely charged atoms, or ions, is an ionic bond. It can form between any two oppositely charged ions, even if they have not been formed by transfer of an electron, from one to another. eg NaCl