Summary of Lecture 1

- Traditional studies of biology focussed on anatomy and taxonomy because of our technical limitations to probe at the molecular level
- Knowledge gathered from reductionistic approach and technological advances (separation techniques of various types, microscopy, molecular tools like restriction enzymes, etc.) have brought about a paradigm change
    - Modern biology is about pushing the boundaries of knowledge and improving human health and welfare
- Biology can be studied at various levels from biosphere to molecular level (DNA, proteins, lipids, etc.)
- Studying biology can help us to make informed choices to improve our lifestyle

Summary of Lecture 2

- Classification of living systems is hierarchical
  - Has seen revisions over the decades
  - Revisions are necessitated by new discoveries / knowledge
  - Revision can be addition of a new hierarchical level and/or changes at the same level
- Prokaryotes and eukaryotes have compartments that perform specialised functions inside cells
  - Some compartments are membrane-bound; others are membrane-less formed by liquid-liquid phase separation
- Cells have attained different sizes and shapes to perform specialised functions
- Multicellularity evolved to maintain the optimal surface area-to-volume ratio for cell function
- Studying cell morphology has important utilities e.g., clinical diagnosis of diseases such as cervical cancer and malaria

Summary of Lecture 3

- Knowledge of “biological parts” is used to engineer and program organisms to perform a specific desired functions. One such area is Synthetic Biology
- Inheritance of traits by offspring from parents was widely known because these are visible to naked eye
  - This was explained as due to blending – but what got blended was not known
  - Mendel showed that heritable traits are passed on in the form of distinct units (particulate hypothesis)
- Distinct variants of a gene in a population care called as alleles
- Discovery of chromosomes explained Mendel’s observations
  - Offspring inherited one copy of a gene from each parent
  - The combination of the two alleles an offspring inherits (with respect to a trait) is its genotype and is responsible for its phenotype
- Observing a phenotype cannot conclusively indicate the underlying genotype
  - This is due to the presence of dominant and recessive alleles