General introduction to MICROBIOLOGY
Historical background and Classification of Microorganisms

What is microbes, or microorganisms

- Smaller than 0.1mm
- Some examples of microbes:
  - Bacteria, fungi, protozoa, algae, viruses
- Some are pathogenic
- Many are beneficial
Defining Microbiology

- The study of organisms too small to be seen with the naked eye
- These organisms include viruses, bacteria, algae, fungi, and protozoa
- Microbiologists are concerned with characteristics and functions such as morphology, cytology, physiology, ecology, taxonomy, genetics, and molecular biology
History of microbiology

- **Anton van Leeuwenhoek (1632–1723):** was the first microbiologist and the first person to observe bacteria using a single-lens microscope of his own design.
Germ theory of disease Replaces Fate and Sins

Many diseases are caused by the growth of microbes in the body and not by sins, bad character, or poverty.
Microbes make the Universe

- There are $> 5 \times 10^{30}$ types of Microbes in the world
- Humans have intimate relation with Microbes $> 90\%$ of the cells in our Body are Microbes
Classification of Microorganisms

Three domains:

- Non-cellular organisms:
  - Viruses

- Prokaryotic cells:
  - Bacteria
  - Archaea

- Eukaryotic cells:
  - Protists
  - Protozoa
  - Fungi
  - Plants
  - Animals
Eukaryotic and Prokaryotic
Scientific Nomenclature of Microorganisms

- Carolus Linnaeus (1735) established the system of scientific nomenclature
- Each organism has two names:
  - The genus and specific epithet
  - Are italicized or underlined
  - The genus is capitalized and the specific epithet is lower case
- For example
  - Kingdom: Bacteria
  - Phylum: Firmicutes
  - Class: Bacilli
  - Order: Lactobacillales
  - Family: Lactobacillaceae
  - Genus: Lactobacillus
  - Species: *L. delbrueckii*
  - Subspecies: *L. d. bulgaricus*
Microbes are involved in

- Nutrient production & energy flow
- Decomposition
- Production of foods, drugs & vaccines
- Bioremediation
- Causing disease
We must be familiar with Knowledge On...

- Names of the Microbes
- Pathogenic Microbes
- Commensal Organisms
- Names of the diseases
- Mode of transmission
- Identify whether Bacteria, Virus, Parasite or Fungi (Lab diagnosis)
- Treating and Preventing
Branches of study within Microbiology

- Immunology
- Public health microbiology & epidemiology
- Food, dairy and aquatic microbiology
- Biotechnology
- Genetic engineering & recombinant DNA technology