**SESSIONS FOR HUMAN GENETICS**

Population genetics

Disease Genetics

Human genetic diversity

Human Genome Project

Epigenetics

Gene therapy

Bacterial genome size

Behavioral genetics

Genetic Cloning

DNA mutation

Genes mutation

Genetic susceptibility to human obesity

Genomics

Genetic Engineering

Gene Regulation

Genetic vaccines

Genetic development

Synthetic biology

Molecular genetics

Genome integrity

CRISPR-Cas9 Gene Editing

Cell biology

Transcription, translation, and DNA replication

Chromosomes

Cell Cycle

Pharmacogenetics

Mitochondrial genetics

Clinical genetics

Gene Expression Profiling

Oncogenomics

Cardiovascular Genetics

1.Population genetics is the study of genetic variation within populations and how evolutionary processes—such as natural selection, genetic drift, migration (gene flow), and mutation—affect allele frequencies over time.

The gene pool refers to all the genetic material in a population, while allele frequency is the proportion of a specific allele in the gene pool. The Hardy-Weinberg equilibrium describes a scenario where allele frequencies remain constant from generation to generation in the absence of evolutionary influences. The Hardy-Weinberg equation (p² + 2pq + q² = 1) is used to predict genotype frequencies under ideal conditions.

Evolutionary forces like natural selection, genetic drift, mutation, and gene flow can alter allele frequencies. The genetic bottleneck and founder effect are examples of processes that reduce genetic diversity. Additionally, inbreeding (mating between closely related individuals) can increase harmful genetic traits, while outbreeding (mating between different populations) usually enhances genetic diversity.

Applications of population genetics include conservation biology, where genetic diversity is crucial for species survival, and medicine, where genetic variations influence disease susceptibility. In agriculture, population genetics helps maintain genetic diversity in crops and livestock. Overall, it sheds light on evolutionary processes, species adaptation, and genetic health.