CLUSTER UNIVERSITY SRINAGAR

GENETICS AND EVOLUTIONARY BIOLOGY

ZOOLOGY
THEORY

SEM – IV

CORE COURSE IV
CREDITS (4)

Unit I

1.1. Mendalian inheritance, Non-Mendalian Inheritance (Incomplete and Co-domonance), Multiple alleles, Lethality
1.2. Gene interaction, Epistasis-Complementary and Supplementary ratios; Extra chromosomal Inheritance (Mitochondria, Chloroplast and Kappa in Paramecium
1.3. Sex linked inheritance, Linkage, Crossing over, Linkage maps
1.4. Sex determination, Chromosomal basis, Genic balance theory, Dosage compensation

Unit II

2.1. Nature of genetic material, DNA structure, organization of genetic material in prokaryotes and eukaryotes; Euchromatin and heterochromatin
2.2. DNA replication-Semiconservative replication experiment; replication in prokaryotes and eukaryotes
2.3. Transcription and Translation-Mechanism of transcription in prokaryotes and eukaryotes; Post transcriptional modification of mRNA, protein biosynthesis- Genetic code, Mechanism of translation
2.4. Mutations- Structure and Numerical changes in chromosomes; Gene mutation

Unit III

3.1. Introduction to Evolutionary theories-Lamarckism, Darwinism, Neo-Darwinism
3.2. Evidences of evolution-Types of fossils, dating of fossils, Phylogeny of horse
3.3. Processes of Evolutionary change-Organic variations; isolating mechanism; Natural selection; Industrial melanism
3.4. Natural selection-Directional, Stabilizing and Disruptive selection, Artificial selection

Unit IV

4.1. Species concept- Biological species concept; Modes of speciation (Allopatric and Sympatric)
4.2. Macro-evolution-Macro-evolutionary Principles (example: Darwin's Finches)
4.3. Extinction-Mass extinction, Causes and Role of extinction in evolution
4.4. Major extinctions-K-T extinction

PRACTICAL

CREDITS (2)

1. Study of Human Karyotopes (normal and abnormal)
2. Verification of Monohybrid Mendalian Ratio
3. Verification of Dihybrid Mendalian Ratio
4. A study of mendalian traits in Human
5. Determination of allelic and genotypic frequencies
6. Pedigree analysis and pedigree charts
7. Problems in genetics
8. Study of fossil evidences from pictures
9. Study of hontology and analogy from suitable specimens/pictures
10. Charts

a) Phylogeny of horse with diagrams

b) Darwins finches with diagrams/cuts outs of beaks of different species

11. Study of human blood groups
12. Visit to Natural History museum and to national parks within and outside state and submission of report

Head
Dept. of Zoology