

**SARDAR PATEL UNIVERSITY**  
**Programme and Subject : B.Sc (Genetics)**  
**Semester : III**  
**Paper code: US03CGEN21**  
**Total Credit: 4 (4 lectures/week)**  
**(Syllabus with effect from June -2019)**

**Title of paper: Principles of Genetics –I**

**UNIT- I:** History of genetics, Mendel's Experimental Design, Rediscovery of Mendel's Laws, Laws of inheritance with reference to mono-, di- and tri-hybrid crosses, Goodness of fit. Interaction of genes- epistasis, supplementary genes, inhibitory genes, complimentary genes, lethal genes, modifying genes, multiple alleles, Pleiotropy, Co-dominance, Penetrance and expressivity Mendelian genetics in Humans (pedigree analysis, genetic traits).

**UNIT - II:** Origin of life on Earth. Theories of evolution and inheritance. Model genetic system: Lambda phage, E. coli, Neurospora, Yeast, Drosophila, Arabidopsis, mice and maize. Qualitative and Quantitative traits. Introduction to quantitative inheritance. Hardy-Weinberg law. Gene and genotype frequency, factors affecting gene and genotype frequency-mutation, migration, selection and genetic drift.

**UNIT – III:** Linkage and crossing over: Chromosome theory of linkage, kinds of linkage with examples, linkage groups, significance of linkage. Crossing over- mitotic and meiotic crossing over, synapsis, theories of mechanism of crossing over, cytological detection of crossing over, kinds of crossing over, significance, mapping of chromosome.

**UNIT- IV:** Introduction to Biostatistics,· Definition of statistics and biostatistics,· Development and applications of biostatistics, Collection and Presentation of data,· Classification and tabulation,· Diagrammatic (Line chart, Pie chart and multiple bar) and Graphical representation (Histogram , frequency polygon, frequency curve ), Measures of central Tendency: Mean, Median and Mode. Geometric mean and Harmonic mean  
Percentile, Selection of the appropriate measure of central Tendency, Measures of Dispersion: Range and Interquartile range, Mean deviation, Variance, standard deviation and their coefficients.

**References:**

1. Fundamentals of Genetics - B.D. Singh, Kalyani Publishers.
2. Genetics - Strickberger 3rd Ed. Prentice Hall of India Pvt. Ltd.
3. Principles of Genetics – D. Peter Snustad & Michael J. Simmons, John Wiley & Sons. Inc
4. Cell Biology, Genetics, Molecular Biology, Evolution & Ecology - Verma & Agarwal, S. Chand & Company Ltd.
5. Genetics – Peter J. Russel 5th Ed. Benjamin Cummings Publishing Company
6. Genetics - P.K. Gupta 3rd Ed. Rastogi Publications.
7. Molecular Biology of the cell - Bruce Alberts 5th Ed. G.S. Garland Science- Taylor & Francis Inc.
8. Cell biology - Satyeshchandra Roy and K. K. De
9. Introduction to Genetics - Daniell L. Hartl & Elizabeth W. Jones 7th Ed. Jones & Bartlett Publishers

**SARDAR PATEL UNIVERSITY**  
**Programme and Subject : B.Sc (Genetics)**  
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**Paper code: US03CGEN22**  
**Total Credit: 4 (4 lectures/week)**  
**(Syllabus with effect from June -2019)**

**Title of paper: Animal Physiology**

**UNIT I – CIRCULATORY SYSTEM AND DISEASES**

Composition of blood, functions of blood plasma, functions of rbc, wbc and platelets, formation of blood cells, coagulation of blood cells and types of anticoagulants, types of hearts, structure and working of human heart, eeg, cardiac cycle, blood group abo system, rh factor and blood transfusion.

- Lymphatic system – components, functions of lymph, structure and functions of primary and secondary lymphoid organs
- Diseases – anemia and its types, haemophilia, leukemia, coronary artery disease, hypertension – types and causes.

**UNIT II – RESPIRATORY SYSTEM AND DISEASES**

- Organs of respiratory system, pulmonary ventilation, lung volumes and capacities, exchange of oxygen and carbon dioxide, transport of oxygen and carbon dioxide, control of respiration
- Diseases – asthma, chronic obstructive pulmonary disease, emphysema, chronic bronchitis, lung cancer, pneumonia, tuberculosis, coryza and influenza, pulmonary edema, cystic fibrosis

**UNIT III – ENDOCRINOLOGY AND DISEASES**

- Endocrine glands
- Hormones: functions, circulating and local hormones, chemical classes of hormones, mechanisms of hormone action, action of lipid and water soluble hormones
- Endocrine glands and their locations, secretions and functions of hormones of anterior and posterior pituitary, thyroid, parathyroid, adrenal, pancreatic islets, ovaries and testes, disorders of endocrine glands

**UNIT IV - PARASITOLOGY AND ANIMAL ADAPTATIONS**

- Life cycle and pathogenicity of balantidium coli, leishmania donovani, trypanosoma gambiense
- Life cycle and pathogenicity of ancylostoma duodenale, enterobius vermicularis, trichinella spiralis, dracunculus, ascaris lumbricoides
- Terrestrial adaptations: desert, burrowing, cursorial, arboreal, volant
- Aquatic adaptations: fresh water and marine water
- Special adaptations: mimicry, camouflage, echolocation, electric organ

**REFERENCE BOOKS:**

- A text book of animal physiology by a. K. Berry
- Animal physiology by m. P. Arora
- Principles of anatomy and physiology by tortora and grabowsky
- Economic zoology by shukla and upadhyay
- Chordate zoology by jordan and verma

**SARDAR PATEL UNIVERSITY**  
**Programme and Subject: B.Sc (Genetics) Practical syllabus**  
**Semester: III**  
**Paper code: US03CGEN23**  
**Total Credit: 2 (4 hours /week)**  
**(Syllabus with effect from June -2019)**

1. Seed viability test
2. Measurement of stature, hands and head circumference, Dermatoglyphics.
3. Seed exercise to calculate segregation ratio and goodness of fit for mono- and di-hybrid crosses.
4. Study of blood groups (A, B, O, Rh)
5. Examples on interaction of genes and linkage.
6. Problems related to blood group analysis.
7. Drosophila culture procedures and observing different phenotypes of drosophila and development stages
8. Study of different Drosophila Mutant.
9. Classification and tabulation of data
10. Problems on gene and genotype frequency and HW law
11. Practical on Histogram, frequency polygon, frequency curve.
12. Measures of central tendency
13. Measures of dispersion

**B.Sc (Genetics) Practical syllabus**  
**Semester: III**  
**Total Credit: 2 (4 hours /week)**  
**(Syllabus with effect from June -2019)**

1. Study of types of blood cells
2. Hemoglobin estimation
3. Haemin crystal formation
4. Total wbc count
5. Total rbc count
6. Histology of spleen, lungs, thyroid gland, adrenal gland, pancreas, testis and ovary
7. Life cycle and pathogenicity of balantidium coli, leishmania donovani, trypanosoma gambiense, ancylostoma duodenale, enterobius vermicularis, trichinella spiralis, dracunculus, ascaris lumbricoides
8. Study of adaptations of terrestrial, aquatic
9. Special adaptations
10. Study tour