Govt. College, Ropar

Department of ZOOLOGY

Class B.Sc.3rdSem.

(Session 2021-22)

Biochemistry AND Animal Physiology

Week	Lesson scheduled
1st	➢ Biochemistry: its scope and importance, chemical bonds and energy, Biomolecules: configuration and conformation, Properties of water as biological solvent, Introduction to metabolism..
2nd	➢ Carbohydrates: Structure and Biological importance- Monosaccharides, Disaccharides, Polysaccharides; Derivatives of Monosaccharides; Carbohydrate metabolism: Glycolysis, Citric acid cycle, Pentose phosphate pathway, Gluconeogenesis, Glycogenesis, Glycogenolysis.
3rd	➢ Proteins: Amino acids- Structure, Classification, General and Electrochemical properties of α-amino acids; Physiological importance of essential and non-essential amino acids
4th	➢ Peptide Bond stabilizing protein structure; Levels of protein organization; Protein metabolism: Transamination, Deamination, Urea cycle, Fate of C-skeleton of Glucogenic and Ketogenic amino acids
5th	➢ Lipids: Structure and Significance: Physiologically important saturated and unsaturated fatty acids, Triacylglycerols, Phospholipids, Sphingolipid, Glycolipids, Steroids.
6th	➢ Steroids, Eicosanoids and terpenoids. Lipid metabolism: β-oxidation of fatty acids - Palmitic acid, Linoleic acid; Fatty acid biosynthesis, Formation of lipid bi-layer
7th	➢ . Nucleic Acids: Structure of Purines, Pyrimidines, Nucleosides and Nucleotides; Nucleic Acid Metabolism: Catabolism of Adenosine, Guanosine, cytosine and thymine.
8th	➢ Enzymes : Nomenclature and classification; Cofactors; Specificity of enzyme action; Isozymes; Mechanism of enzyme action.
9th	➢ Enzyme kinetics; Derivation of Michaelis-Menton equation, Lineweaver-Burk plot; Factors affecting rate of enzymecatalyzed reactions; Enzyme inhibition
10th	➢ **MST**

Continued.

11th	➢ Digestion: Physiology of digestion in the alimentary canal; Absorption of carbohydrates, proteins, lipids ➢ Excretion: Structure of nephron, Mechanism of Urine formation, Counter-current Mechanism, Osmoregulation
12th	➢ Respiration: Pulmonary ventilation, Respiratory volumes and capacities, Transport of Oxygen and carbon dioxide in blood, Oxygen dissociation curve of haemoglobin, Bohr effect, chloride shift, Haldane effect and control of breathing.
13th	➢ Cardiovascular system: Composition of blood, molecular structure and function of haemoglobin, blood clotting, blood groups including Rh-factor.haemostasis and haemopoiesis. Origin and conduction of the cardiac impulse, Cardiac cycle, electrocardiogram
14th	➢ Structure and physiology of endocrine glands- thyroid; Parathyroid, adrenal, hypothalamus, pituitary, pancreas and gonads.
15th	➢ Muscle: Ultra-structure of skeletal muscle, Molecular and chemical basis of muscle contraction.

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Class B.Sc.4th Sem. **(Session 2021-22)**

Evolutionary Biology AND Genetics

Week	Lesson scheduled
1st	Life's Beginnings: Chemogeny, RNA world, Biogeny, Origin of photosynthesis, Evolution of eukaryotes Historical review of evolutionary concept: Lamarckism, Darwinism, NeoDarwinism
2nd	Sources of variations: Heritable variations and their role in evolution, types of variations Evidences of Evolution: Fossil record (types of fossils), transitional forms,
3rd	Evidences of Evolution: geological time scale, evolution of horse and man, Evidences of Evolution: Molecular evolution (three domains of life, neutral theory of molecular evolution, molecular clock
4th	Hardy-Weinberg Law (its assumptions and applications) Natural selection and other forms of selection. Genetic Drift - mechanism, founder's effect, bottleneck phenomenon;
5th	Allele Frequencies - Role of Migration and Mutation in changing allele frequencies) Product of evolution: Micro and Macro evolution and isolating mechanisms,
6th	Micro evolutionary changes (inter-population variations), Modes of speciation Extinctions, Back ground and mass extinctions (causes and effects), detailed example of K-T extinction
7th	Origin and evolution of man, Unique hominid characteristics contrasted with primate characteristics, from Dryopithecus leading to *Homo sapiens*, molecular analysis of human origin
8th	Chromatin and the Nucleosome: Structure of Nucleosome. Chromatin structure Euchromatin, Heterochromatin-Constitutive and Facultative heterochromatin. Organization of Chromosomes. Mendelism, Non- Mendelian Gene Interactions: Complementary factor, Epistatic gene, Duplicate genes, Supplementary factor, Lethal genes, Pleiotropism. Incomplete Dominance
9th	Multiple Alleles: Inheritance of ABO Blood groups in Man, Rh factor and Erythroblastosis foetalis in Man, Polygenic inheritance- Skin pigmentation in Man, Eye colour in *Drosophila*. Linkage –Types, theories and significance Crossing over-Mechanism of crossing over, Factors affecting crossing over, Significance and consequences of crossing over.
10th	**MST**

Continued

11th	MST
12th 12th continued	Cytoplasmic Inheritance: Definition, characteristics, and examples: Shell coiling in *Pila* and Kappa particles in *Paramecium*. Mutation: Chromosomal Mutations: Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy; Gene mutations: Induced versus Spontaneous mutations, Back versus Suppressor mutations, Molecular basis of Mutations in relation to UV light and chemical mutagens, Detection of mutations
13th	Sex determination: Autosomes and allosomes (sex chromosomes), Chromosomal methods of sex determination – XO, XY (Man and Drosophila), ZZ,ZW . Sex linked inheritance: Sex linked inheritance in *Drosophila*, Sex linked inheritance in man –colourblindness, Haemophilia, Hypertrichosis and Baldness
14th	Transposable genetic elements: Prokaryotic transposable elements- IS elements, Eukaryotic transposable elements- P elements in Drosophila; Uses of transposons Genetic Analysis in Bacteria: Conjugation, Transformation, Transduction
15th	Human Genetics: Syndromes – Turner's, Klinefelter's, Down's and Cri-du-chat, In Born errors of metabolism –Phenylketonuria (PKU), Alkaptonuria, Albinism, Human pedigree analysis.

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