

SECOND SEMESTER:

ZOOL.201: GENERAL AND COMPARATIVE ANIMAL PHYSIOLOGY

UNIT -I

- 1. Blood and circulation: Blood corpuscles, haemopoiesis and formed elements, plasma function, blood volume, blood volume regulation, blood groups, hemoglobin, immunity haemostasis.
- 2. Respiratory system: Comparison of respiration in different species, anatomical considerations, transport of gases, exchange of gases, waste elimination.
- 3. Respiratory pigments through different phylogenic groups.
- 4. Neutral and chemical regulation of respiration.

UNIT-II

- 5. Excretory system: Comparative physiology of excretion, kidney, urine, formation, urine concentration, waste elimination & micturition.
- 6. Regulation of water, balance, blood volume, blood pressure, electrolyte balance, acid-base balance.
- 7. Digestive system: Digestion, absorption, energy balance, BMR.
- 8. Thermoregulation: Comfort zone, body temperature – physical, chemical, neural regulation, acclimatization.

UNIT-III

- 9. Cardiovascular System: Comparative anatomy of heart structure, myogenic heart, specialized tissues.
- 10. ECG- its principle and significance, cardiac cycle, heart as a pump, blood pressure, neural and chemical regulation of all above.
- 11. Nervous system: Neurons, action potential, gross neuroanatomy of the brain and spinal cord, central and peripheral nervous system, neural control of muscle tone and posture.
- 12. Physiology of impulse transmission through nerves and synapse.

UNIT-IV

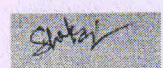
- 13. Comparative study of mechanoreception
- 14. Comparative study of photoreception
- 15. Comparative study of phonoreception
- 16. Comparative study of chemoreception

UNIT-V

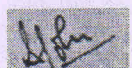
- 17. Sense organs: Vision, hearing and tactile response.
- 18. Stress and adaptation.
- 19. Endocrinology and reproduction: Endocrine glands, basic mechanism of hormone action, hormones and diseases: reproductive processes.
- 20. Neuroendocrine regulation of Hormones, their classification and chemical nature.

Suggested Readings:

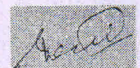
Prosser, C.L. Comparative animal physiology. W.B. Saunders and Co.
 Eckert, R. Animal physiology– Mechanisms and adaptation. W.H. Freeman and Co.
 Hoar, W.S. General and Comparative Animal physiology.
 Schemdt-Neilsen. Animal Physiology: Adaptation and Environment. Cambridge Prosser, C.L. Environmental and Metabolic Physiology. Wiley-Liss, New York
 Sharma Dushyant Kumar: Biology of strass, Siya Publishing House, New Delhi.



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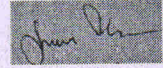
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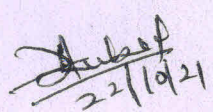
Dr. D.K. Sharma

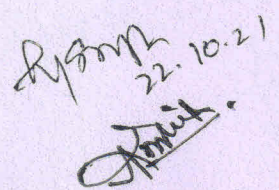


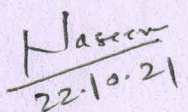
Dr. Praveen Tamot

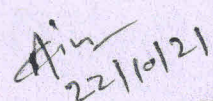


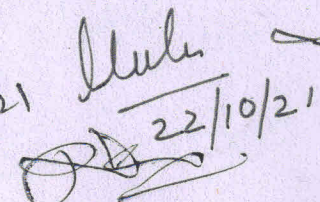
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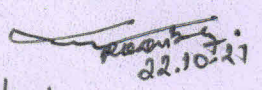

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ZOOL. 202: BIOMOLECULES, STRUCTURE & FUNCTIONS

1. Primary, secondary, tertiary and quaternary structures of proteins
2. Protein folding and denaturation
3. DNA: Double helical structure of DNA: Replication & Recombination
4. RNA: Types and Structure of RNA; Cellular functions of different RNAs

UNIT-II

5. Basic concept of metabolism: Coupled and interconnecting reactions of metabolism, cellular energy resources and ATP synthesis
6. Glycolysis and glyconeogenesis
7. Citric acid cycle: Oxide phosphorylation
8. Pentose Phosphate Pathway and Glyconeogenesis.

UNIT-III

9. Functional importance of lipid storage & membrane lipids; lipid storage diseases
10. Fatty acid metabolism: Synthesis and degradation of fatty acids
11. Protein Synthesis
12. Bile Composition and functions: bile dysfunction associated diseases

UNIT-IV

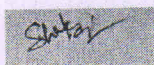
13. RNA synthesis and splicing
14. Biosynthesis of amino acids
15. Biosynthesis of nucleotides
16. Biosynthesis of membrane lipids and steroids.

UNIT-V

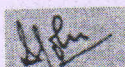
17. Enzymes: Basic concepts and kinetics
18. Mechanism and Regulation of enzyme catalysis
19. Concept of free energy and thermodynamic principles in biology
20. Energy rich bonds, compounds and biological energy transducers

Suggested Readings:

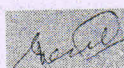
Voet, D. and J.G. Voet. Biochemistry. John Wiley & sons
Freifelder, D. Physical Biochemistry. W.H. Freeman & Co.
Segal, I.H. Biochemical Calculations. John Wiley and Sons
Creighton, T.E. Protein Structure and Molecular Properties. W.H. Freeman & Co.
Freifelder, D. Essentials of Molecular Biology.
Cooper, T.G. Tools of Biochemistry.
Hawk. Practical Physiological Chemistry.
Garret, R.H. and C.M. Grisham: Biochemistry. Saunders College Publishers.
Sharma Dushyant Kumar: Biochemistry, Narosa Publishing House, New Delhi.



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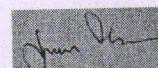
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Sanjay
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ZOOL. 203: POPULATION ECOLOGY AND ENVIRONMENTAL BIOLOGY

UNIT-I

1. Biodiversity Conservation
2. Biodiversity laws, significance and management approaches.
3. Population ecology: Characteristics of a population: population growth curves: population regulation: life history strategies (r and k selection)
4. Concept of meta population- demes and dispersal, interdemec extinctions, age structured Populations

UNIT-II

5. Conservation biology: Principles of conservation, major approaches to management, Indian case studies on conservation/management strategy (Project Tiger and Gharial, Biosphere reserves)
6. Adaptation: Levels of adaptation, mechanisms and significance of body size
7. Biogeography: Major terrestrial biomes: bio geographical zones of India
8. Aquatic environments: Freshwater, marine and estuarine environments

UNIT-III

9. Eco-physiological adaptations to terrestrial fresh water and marine water environments
10. Ecological succession: Types: mechanisms: changes involved in succession: concept of elimax
11. Environmental limiting factors
12. Sustainable development, Ecological modeling: Fundamentals of constructing models

UNIT-IV

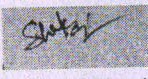
13. Inter and intra specific relationship competition, Predatory- prey relationship, predator dynamicm optimal foraging theory
14. Mutualism, evolution of plant- pollinator interaction
15. Environmental pollution: global environmental change: Environmental impact assessment
16. Vermi composting technology and Rain water harvesting Technology

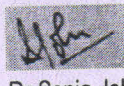
UNIT-V

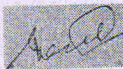
17. Quality Monitoring of Water Sample BOD,COD, Different types of solids and MPM Coliforms
18. Techniques of Waste water recycling: Methods Involved in Domestic waste water recycling,
19. Techniques of Waste water recycling: Methods Involved in Industrial waste water recycling
20. Various Acts related to Environment management viz.Air Acts, Water Acts, Hazardous Waste management Acts Municipal solid waste management acts, Biomedical waste management acts, Plastic waste management acts, and E-waste management Acts.


Suggested Readings:

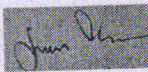
Cherrett, J.M. Ecological Concepts. Blackwell Science Publication, Oxford, U.K.
Elseth, B.D. and K.M. Baumgartner. Population Biology. Van Nostrand Co. New York
Jorgensen, S.E. Fundamentals of Ecological Modeling. Elsevier, New York
Krebs. C.J. Ecology, Harper & Row. New York
Krebs. C.J. Ecological Methodology. Harper & Row, New York
Eckert, R. Animal Physiology: Mechanisms and Adaptation. W.H. Freeman and Co. New York
Hochachka P.W. and G.N. Somero, Biochemical Adaptation. Priceton, New Jersey
Schiemdt Nielsen. Animal Physiology: Adaptaion and Environment. Cambridge
Willmer, P.G. Stone and Johnston. Environmental Physiology. Blackwell Science Publication, Oxford, U.K.
Louw, G.N. Physiological Animal Ecology. Longman Harlosss, U.K.
V.P.Kudesia and Ritu Kudesia, Industrial Pollution. Pragati Prakashan Meerut
B.K.Sharma, Water Pollution. Goel Publication House Meerut
S.M.Khopkar, Environmental Pollution Analysis. IInd Edition New Age International Publication
N.Arumugam & V.Kumaresan, Environmental Science and Engineering. IIIrd Edition Saras Publication
Dr.S.R.Myneni, Environmental Law. Central Law Publication
Dr.S.C.Tripathi,Environmental Law.Central Law Publication
Dr.Aniruddh Prasad & Chandresan Pratap Singh, 8th Edition Paryavaran evam paryavaraniya sanrakshan vidhi ki rooprekha
Dr.Vishal Goyal & Dr.Anant Goyal, Jaivik kheti mien vermicompost evam kenchue ka mahatv. Rama Publication House, Meerut
American Public Health Association APHA/AWWA/WPCF

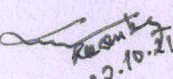

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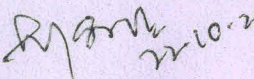

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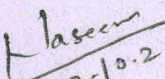

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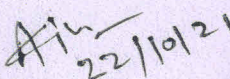

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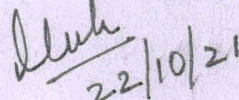

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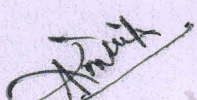

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ZOOL. 204: BIOSYSTEMATICS, TAXANOMY AND EVOLUTION

UNIT-I

1. Definition and basic concepts of biosystematics and taxonomy
2. Trends in biosystematics: Chemotaxonomy, cytotaxonomy and molecular taxonomy
3. Dimensions of speciation and taxonomic characters
4. Species concept: Different species concepts

UNIT-II

5. Species category, sub- species and other infra- specific categories
6. Theories of biological classification
7. Taxonomic categories & Hierarchy of categories
8. Taxonomic characters: Different kinds, origin of reproductive isolation, biological mechanism of genetic incompatibility

UNIT-III

9. Taxonomic procedures: Taxonomic collections, preservation, curation, process of identification
10. Taxonomic keys: Different kinds of keys, their merits and demerits
11. International code of Zoological nomenclature (ICZN): Operative principles interpretation & application of important rules formation of scientific names of taxa
12. Concepts of evolution and theories of organic evolution

UNIT-IV

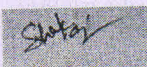
13. Neo-Darwinism and population genetics: Hardy- Weinberg Law of genetic equilibrium: Gene frequency and the destabilizing forces (natural selection, mutation, genetic drift, migration & meiotic drive)
14. Molecular population genetics, Pattern of changes in nucleotide and amino acid sequences Ecological significance of molecular variations (genetic polymorphism)
15. Speciation: Patterns and mechanisms of reproductive isolation: Modes of speciation: Allopatry & Sympatry
16. Zoo-geological time scale


UNIT-V

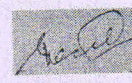
17. Trends in evolution
18. Molecular evolution: Gene evolution of gene families
19. Molecular phylogenetics: Construction of phylogenetic tree, Amino acid sequences and phylogeny
20. Nucleic acid phylogeny: DNA-DNA hybridization, restriction enzyme sites, nucleotide sequence comparison and homologies


Suggested Readings:

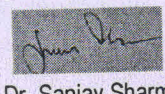
Kato, M. The Biology of Biodiversity, Springer
Avice, J.C. Molecular Markers, Natural History and Evolution. Chapman & Hall, New York
Wilson, E.O. Biodiversity, Academic Press, Washington
Simpson, G.G. Principle of Animal Taxonomy, Oxford IBH Publishing Company
Mayor, E. Elements of Taxonomy
Wilson, E.O. The Diversity of Life (College Edition) W.W. Northerm & Co.
Tikadar, B.K. Threatened Animals of India, ZSI Publication, Calcutta
Dobzhansky, Th. Genetics and Origin of Species. Columbia University, Press
Dobzhansky, Th. F.J. Ayala G.L. Stebbines and J.M. Valentine Evolution. Surjeet Publication Delhi
Futuryama, D.J. Evolutionary Biology. Suinuaer Associates. INC Publishers. Dunderland
Jha, A.P. Genes and Evolution, John Publication, New Delhi
Merrel, D.J. Evolution and Genetics. Holt, Rinchart and Winston, Inc
Strikberger, M.W. Jones and Bartett Publisher, Boston London

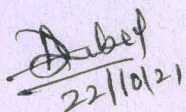

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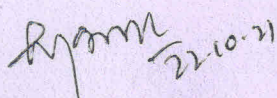

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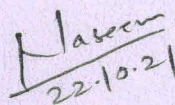

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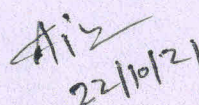

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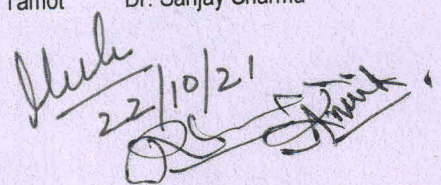

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