## GENERAL AND COMPARATIVE ANIMAL PHYSIOLOGY AND ENDOCRONOLOGY
## ZOO201

**UNIT-I**
1. Respiratory pigments through different phylogenic groups
2. Transport of oxygen and carbon dioxide in blood and body fluids
3. Regulation of respiration
4. Physiology of impulse transmission through nerves and synapses
5. Autonomic nervous system, neurotransmitters and their physiological Functions

**UNIT-II**
1. Patterns of nitrogen excretion in different animal groups
2. Comparative physiology of digestion
3. Osmoregulation in different animal groups
4. Thermoregulation in homeotherms, poikilothermas and hibernation
5. Physiology of pregnancy, placental hormones, pregnancy diagnosis tests, parturition and breast and lactation

**UNIT-III**
1. Comparative study of mechanoreception
2. Comparative study of photoreception
3. Comparative study of phonoreception
4. Comparative study of chemoreception
5. Comparative study of equilibrium reception

**UNIT-IV**
1. Bioluminescence as means of communication among animals
2. Pheromones and other similar chemicals as means of communication among animals
3. Chromatophores and regulation of their function among animals
4. Hormones, their classification and chemical nature
5. Mechanisms of hormone action

**UNIT-V**
1. Phylogeny of endocrine glands (pituitary, pancreas, adrenal, thyroid)
2. Ontogeny of endocrine glands
3. Neuroendocrine system
4. Hormone receptors . signal transduction mechanisms
5. Hormones and reproduction
a. Seasonal breeders
b. Continuous breeders

**Suggested Readings:**
1. EJW Barrington-General & comparative Endoctrinology-Oxford, Claredon Press
2. R.H. Williams-Text Book of Endocrinology-W.B. Saunders
3. C.R. Martin- Endocrine Physiology-Oxford University Press.
4. Molecular CellBiology-J. Darnell, H. Lodish and D. Baltimore-Scientific American Book USA
5. Molecular Biology of the cell-B. Alberts, D-Bray, J.Lewis, M. Raff, K. Roberts and J.D. Watson, Garland Pub. New York.

**Population Ecology and Environmental physiology**

**ZOO202**

**UNIT-I**

1. Populations and their characters.
2. Demography : Life tables, generation time, reproductive value.
3.Population growth: Growth of organisms with non-overlapping generations,stochastic and time lag models of population growth, stable age distribution.
4.Population regulation: Extrinsic and intrinsic mechanisms.

**UNIT-II**

1. Adaptations : Levels of adaptations, significance of body size.
2. Aquatic environments : Fresh water, marine, shores and estuarine environments.
3. Eco-physiological adaptations to fresh water environments.
4. Eco-physiological adaptations to marine environments.
5. Eco-physiological adaptations to terrestrial environments.

**UNIT-III**

1. Environmental limiting factors.
2. Inter and intra-specific relationship.
3. Predatory- prey relationship, predator dynamics, optimal foraging theory (patch choice, diet choice, prey selectivity, foraging time).
4. Mutulism , evolution of plant pollinator interaction.

**UNIT-IV**

Environmental pollution and human health.

1. Conservation management of natural resources .
2. Environmental impact assessment.
3. Sustainable development.

**UNIT-V**

1. Concept of homeostasis.
2. Endothermic and physiological mechanism of regulation of the body temperature.
3. Physiological response to oxygen deficient stress.
4. Physiological response to body exercise.
5. Meditation, yoga and their effects.

**Suggested Readings:**

1. Cherrett,J.M. Ecological Concepts. Blackwell Science Publication, Oxford, U.K.
2. Elseth,B.D. and K.M. Baumgartner,population Biology,Van Nostrand Co., New York.
3. Jorgensen,S.E. Fundamentals of ecological modeling. Elsevier, New York.
4. Krebs, C.J. Ecology. Harper and Row, New York.
5. Krebs,C.J. Ecological Methodology. Harper and Row , New York.
6. Eckert, R. Animal Physiology: Mechanism and Adaptation. W.H. Freeman and Co., New York.
7. Hochachka, P.W. and G.N., Somero. Biochemical adaptation. Priceton, New Jersey.

**Tools and techniques in Biology**
**ZOO203**

**UNIT-I**
1. Microsocopy, principle & applications
- Light microscope and phase contrast microscope
- Fluorescence microscope
- Electron microscope
- Confocal microscopy
2. General Principle and applications of
- Colorimeter
- Spectrophotometer
- Ultra centrifuge
- Flame photometer
- Beer and Lambert.s law.
3. Microbiological techniques
- Media Preparation and sterilization
- Inoculation and growth monitoring.
- Microbial assays.
- Microbial identification (cytological staining methods for bacterial and fungal strains)
-Use of fermentors

**UNIT-II**
1. Computer aided techniques for data presentation data analysis, statistical techniques.
2. Cryotechniques
- Cryopreservation of cells, tissues, organs and organisms.
- Cryosurgery
- Cryotomy
- Freeze fracture and freeze drying.
3. Separation techniques.
- Chromatography, principle type and applicants.
- Electrophoresis, Principles, types and applications PAGE and agarose gel electrophoresis.
- Organelle separation by centrifugation.

**UNIT-III**
1. Radioisotope and main isotope techniques in biology.
a. Sample preparation for radioactive counting
b.Autoradiography.
2. Immunological techniques
- Immunodiffusion (Single & Double)
- Immuno electrophoresis
3. Techniques immuno detection
- Immunocyto / histochemistry
- Immunoblotting, immunodetection, immunofluroscence.
4. Surgical techniques.
- Organ ablation (eg. Ovariactomy, adrenalectomy)

- Perfusion techniques
- Stereotaxy
- Indwelling cathethers
- Biosensors.

**UNIT-IV**

1. Histological techniques
- Principles of tissue fixation
- Microtomy
- Staining
- Mounting
- Histochemistry
2. Cell culture techniques.
- Design and functioning of tissue culture laboratory
- Culture media, essential components and Preparation
- Cell viability testing.

**UNIT-V**

1. Cytological techniques
- Mitotic and meiotic chromosome preparations from insects
and vertebrates.
- Chromosome banding techniques (G.C.Q. R. banding)
- Flowcytometry.
2. Molecular cytological techniques
- In site hybridization (radio labelled and non-radio labelled methods)
- FISH
- Restriction banding
3. Molecular biology techniques
- Southern hybridization
- Northern hybridization
- DNA Sequencing
- Polymerase chain reaction (PCR)

**Suggested Readings:**

1. Introduction to instrumental analysis-Robert Braun-McGraw Hill.
2. A biologist Guide to principles and Techniques of Practical Biochemistry-
K, Wilson and K.H. Goulding ElBS Edn.
3. Clark & Swizer. Experimental Biochemistry. Freeman, 2000.
4. Locquin and Langeron. Handbook of Microscopy. Butterwaths, 1983
5. Boyer. Modern Experimental Biochemistry. Benjamin, 1993
6. Freifelder. Physical Biochemistry. Freeman, 1982.
7. Wilson and Wlaker. Practical Biochemistry. Cambridge, 2000.
8. Cooper. The Cell-A Molecular Approach. ASM, 1997
9. John R.W. Masters. Animal Cell culture- A practical approach. IRL Press.
10. Robert Braun. Introduction to instrumental analysis. McGraw Hill

**Molecular Cell Biology and Genetics**
**ZOO204**

**UNIT-I**
Biomembrane
- Molecular composition arrangement and functional consequences
- Transport across cell membrane diffusion active transport, pumps, uniports, symports and antiports
- Micro filaments and microtubules structure and dynamics
- Cell movements intracellular transport, role of kinesis and dynein

**UNIT-II**
Cell. Cell signaling
- Cell surface receptors
- Second messenger system
- Signaling from plasma membrane to nucleus
- Gap junctions and connexius
- Integrins

**UNIT-III**
Cell.Cell adhesion and communication
- Ca++ dependant homophilic cell . cell adhension
- Ca++ independant homophilic cell .cell adhension
- Gap junctions and connexius
- Genome organization, hierarchy in organization
- Chromosomal organization of genes and non-coding DNA

**UNIT-IV**
Sex determination
- Sex determination in Drosophila
- Sex determination in mammals
- Basic concept of dosage compensation
- Cytogenetic of human chromosomes
- Human genome project (HGP) purpose 2 implicate

**UNIT-V**
Genetic Diseases and Genomics
- Human gene therapy
- Prenatal diagnosis & genetic counseling
- Genetic screening
- Structural Genomics
- Functional Genomics
- Gene libraries
- Transgenic animals & their applications

**Suggested Readings:**
- J. Darnell, H. Lodish and D. Baltimore molecular cell biology scientific American book. Inc. USA

- B. Alberts D. Bray, J. Lewis, M. raff, K. roberts and J.D. Wattson. molecular biology of the cell. Garland Publishing Inc. New York.
- John R. W. animal cell culture A practical approach masters. Irl. Press
- Alberts et. all Essentials cell biology garland publishing Inc. New York 1998
- J.M. Barry molecular biology
- Philip E. Hartman Gene Action
- L.C. dunn, principals of Genetics
- A.M. Winchester genetics
- Edgar Alterbrg Genetics
- L.C. Dunn genetics and the oregin of species
- Bengt A. Kihlman actions of chemicals of dividing cells