

Introduction of the course:

The animals sustain themselves in their individual as well as in group through the functions of acquiring energy and simplifying it through nutrition, distributing it through circulation and generating energy with oxygen through respiration, eliminating unwanted wastes through excretion; the general concepts of the structural adaptation in different groups of animals to a particular function will be taught.

Course Objectives:

The course is designed:

1. To introduce students about the key concepts of animal Physiology.
2. To introduce students about the general concepts of the structural adaptation in different groups of animals to a particular function.

Contents:

Communication I Nerves: Neurons:

The Basic Functional Units of the Nervous System. Neuron Structure. Neuron Communication Introductory Aspects: Resting Membrane Potential, Action potential (Nerve Impulse), Transmission of the Action Potential between Cells. Invertebrate and Vertebrate Nervous Systems: The Spinal Cord, Spinal Nerves, The Brain, Cranial Nerves, The Autonomic Nervous System.

Communication II: Senses:

Sensory Reception. Invertebrate Sensory Receptors: Baroreceptors, Chemoreceptors, Georeceptors, Hygroreceptors, Phonoreceptors, Photoreceptors, Proprioceptors, Tactile Receptors, Thermoreceptors, Vertebrate Sensory Receptors:, Lateral-Line System and Electrical Sensing, Lateral-Line System and Mechanoreception, Hearing and Equilibrium in Air, Hearing and Equilibrium in Water, Skin Sensors of Damaging Stimuli, Skin Sensors of Heat and Cold, Skin Sensors of Mechanical Stimuli, Sonar, Smell, Taste, Vision.

Communication III: The Endocrine System and Chemical Messengers:

Chemical Messengers. Introductory aspects of hormones and Their Feedback Systems: Biochemistry of Hormones, Feedback Control System of Hormone Secretion, Mechanisms of Hormone Action, Fixed-Membrane-Receptor Mechanism, Mobile-Receptor Mechanism. Some Hormones of Invertebrates: Porifera, Cnidarians, Platyhelminths, Nemertean, Nematodes, Molluscs, Annelids, Arthropods, Echinoderms, An Overview of the Vertebrate Endocrine System, Endocrine Systems of Vertebrates Other Than Birds or Mammals, Endocrine Systems of Birds and Mammals. Circulation and Gas Exchange: Internal Transport and Circulatory Systems: Transport Systems in Invertebrates and Vertebrates. The Hearts and Circulatory Systems of Bony Fishes, Amphibians, Reptiles, Birds and Mammals, Gas Exchange, Respiratory Surfaces, Invertebrate Respiratory Systems, Vertebrate Respiratory Systems, Cutaneous Exchange, Gills, Lungs, Lung Ventilation, Human Respiratory System, Gas Transport.

Nutrition and Digestion:

Evolution of Nutrition. The Metabolic Fates of Nutrients in Heterotrophs. Animal Strategies for Getting and Using Food Continuous Versus Discontinuous Feeders. Diversity in Digestive Structures: Invertebrates and Vertebrates. The Mammalian Digestive System: The various segments and their roles.

Practicals:

Physiology

Comparative adaptations to the particular function in different systems such as nervous system, receptors, endocrine and reproductive system, circulatory system, respiratory system, excretory and nutritive systems in various animal groups will be demonstrated with preserved tissues, organs and organ systems.

Teaching-learning Strategies

1. Lectures

2. Group Discussion
3. Laboratory work
4. Seminar/ Workshop
5. Problems practice to clear genetics concepts

Learning Outcomes:

1. Students are expected to get familiarized with the concepts of animal physiology.

Assessment Strategies:

1. Lecture Based Examination (Objective and Subjective)
2. Assignments
3. Class discussion
4. Quiz
5. Tests

Recommended Readings:

1. Guyton, A.C. and Hall, J.E., 2000. Textbook of Medical Physiology, 10th Edition. W.B. Saunders Company, Philadelphia.
2. Zoology 2002 & 2006. Miller, S.A. and Harley, J.B. WCB/McGraw Hill, New York. Comparative anatomy of vertebrates, 2001. Kent, G.C. and Miller, L. WCB WmC Brown Publishers/McGraw Hill Companies Inc., New York.
3. Bullock, J., Boyle, J. and Wang, M.B., 2001. Physiology, 4th edition. Lippincott, Williams and Wilkins, Philadelphia.
4. Berne, R.M. and Levy, M.N., 2000. Principles of Physiology, 3rd edition. St. Louis, Mosby.
5. Vertebrate anatomy, function, evolution, 2002. Kardong, K.V. WCB WmC Brown Publishers/McGraw Hill Companies Inc., New York.
6. De Robertis and De Robertis. (Latest Edition) Cell and Molecular Biology. Lea and Fibiger, New York.
