DISCIPLINE SPECIFIC COURSE (DSC) - 03
Course: Animal Forms and Structure

Total Credits: 04
Lectures: 30 Hours, Tutorial: 0, Practical: 60 Hours

Objectives:

Zoology is the scientific study of animal life. Animals are the most diverse creatures on this planet. This course gives knowledge about the diversity within different groups, and their interrelationships. The course is designed to understand the general characteristics, classification, basic body plan and levels of organizations in different groups of animals.

Learning Outcomes:

On completion of the course, students will be able to:

- Distinguish between major phyla of animals through characteristic features and diversity.
- Understand the fundamental differences among animal body plans among different phyla.
- Illustrate structure, function and processes related to different groups of animals.
- Observe living animals in the environment and relate observations to theory from the course.

Theory:

Unit 1: 2 Hours

An introduction to the animal kingdom: Non-chordates vs Chordates, Coelom, Body symmetry, Levels of organization.

Unit 2: 1 Hour

Protista: General characters of Protozoa; Locomotory organelles: Pseudopodia, Flagella and Cilia.

Unit 3: **2 Hours**

Porifera: General characters of phylum Porifera, Canal system in Porifera (in brief).

Unit 4: **2 Hours**

Radiata: General characters of phylum Cnidaria and Ctenophora; Polymorphism.

Unit 5: **2 Hours**

Helminthes: General characters of Helminthes (Platyhelminthes and Nemathelminthes).

Unit 6: **7 Hours**

Coelomates (Non-chordates):

General characters of phylum Annelida; Metamerism.

General characters of phylum Arthropoda; Vision in insects.

General characters of phylum Mollusca; Pearl Formation.

General characters of phylum Echinodermata; Water Vascular system in starfish.

Unit 7: **2 Hours**

Protochordates: Salient features of Hemichordates, Urochordates and Cephalochordates.

Unit 8: **12 Hours**

Vertebrates: Brief description of vertebrates.

General characters of Agnatha.

General characters of Pisces; Cartilaginous and Bony fishes, Catadromous and Anadromous migration.

General characteristics of Amphibia; Adaptations for terrestrial life.

General characteristics of Reptilia; Biting mechanism of snakes.

General characteristics of Aves; Flight adaptations in birds.

General characteristics of Mammals; Brief description of prototherian, metatherian and eutherian mammals; Dentition.

Practical: 60 Hours

1. Study of specimens:

Non-chordates: Euglena, Noctiluca, Paramecium, Sycon, Physalia, Tubipora, Meandrina, Taenia, Ascaris, Nereis, Heteronereis, Aphrodite, Hirudinaria, Peripatus, Limulus, Cancer, Daphnia, Julus, Scolopendra, Apis, cockroach, termite, butterfly, Chiton, Dentalium, Octopus, Asterias and Antedon.

Chordates: Balanoglossus, Herdmania, Amphioxus, Petromyzon, Sphyrna, Pristis, Hippocampus, Exocoetus, Diodon/ Tetradon, Icthyophis/ Uraeotyphlus, Bufo, Hyla, Salamandra, Rhacophorus, Draco, Uromastix, Naja, Viper, identification of poisonous and non-poisonous Any three common birds, Funambulus, Loris and Bat.

2. Study through permanent slides:
   (a) Cross section of Sycon and Ascaris (male and female).
   (b) Septal and pharyngeal nephridia of earthworm.
   (c) Placoid, cycloid and ctenoid scales of fishes.

3. Study of organ systems: (Subject to permission from animal ethics committee as per UGC guidelines/ from suitable models).
   (a) Digestive system of cockroach.
   (b) Urinogenital system of rat.

Suggested Readings:

1. Barnes, R.D. (1992). Saunders College Pub. USA.

2. Ruppert, E. E., Fox, R. S., & Barnes, R. D. (2004). Invertebrate zoology: A functional evolutionary approach (5th ed.). Brooks/Cole Publishing Company.

3. Campbell and Reece (2005). Biology, Pearson Education, (Singapore) Pvt. Ltd.
4. Young, J.Z. (2004). The Life of Vertebrates. III Edition, Oxford University Press.
5. Raven, P.H. and Johnson & G.B. (2004). Biology, VI Edition, Tata McGraw Hill Publications

E- contents:

- http://vle.du.ac.in
- Animal Diversity Web (ADW); an online database of animal natural history, distribution, classification, and conservation biology. Web resource https://animaldiversity.org/
- Online Zoo; https://www.activewild.com/online-zoo/.

Keywords:
Coelomates, Chordates, Non chordates, Vertebrates, Metamerism, Coelom, Migration.

Teaching and Learning Process:

Teaching-Learning process will include delivery of lectures using boards, multimedia presentation, short documentaries on animal diversity, imparting practical based knowledge through specimens, live demonstration of diversity in surroundings.

Assessment methods:

- Continuous assessment during entire semester along with the summative assessment by the semester-end.
- Testing through multiple choice questions at the end of each lecture.
- Assess through the project-based work.

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