

ZOH401: ANIMAL TAXONOMY AND EVOLUTION

Teaching hours

10hrs /Unit

COURSE OUTCOMES

1. Taxonomy course uses the lessons specifically designed to achieve student understanding of biosystematics and to move quickly beyond the knowledge level to high-level thinking.
2. Through this course, aspirants are trained to utilize different taxonomic tools like identification keys to identify different groups of organisms.
3. To know and understand the seven levels of classification and apply this knowledge to classify animals from the Kingdom to Species level.
4. Molecular taxonomy and phylogeny is understood.
5. They obtain an academic specialty besides evolutionary trends, species and characteristics, significance of evolution
6. This course inculcates in students, skills required for an animal taxonomist.

UNIT-I

Importance and applications of biosystematics and taxonomy. History of Classification – Linnaeus to new systematics. Higher order taxonomy – Aristotle to Whittaker's five kingdom and Carl Woese's six kingdom and three domains. Trends in biosystematics: Chemotaxonomy, Cytotaxonomy and Molecular taxonomy. Hierarchy of categories- Taxonomic ranks. Subspecies and other Infraspecies categories.

UNIT-II

Taxonomic procedures: Taxonomic collections, preservation, curation, process of identification. Taxonomic keys, different types of keys, their merits and demerits. International code of Zoological Nomenclature (ICZN): Operative principles, interpretation and application of important rules. Major classes of taxonomy (Phenetics, Cladistics and Phylogenetics).

UNIT-III

Dimensions of speciation and taxonomic characters. Species concepts: different types. Modes of speciation (Allopatric, Peripatric, Parapatric and Sympatric speciation). Origin and mechanisms of reproductive isolation. Patterns of speciation: gradualism and punctuated equilibrium. Adaptive radiation. Convergent evolution; Sexual selection; Co-evolution. Interactions among species (competition, predation, parasitism, mutualism and mimicry).

UNIT-IV

Concepts of evolution and theories of organic evolution. Lamarckism, Neo Lamarckism, Darwinism, Neo Darwinism, Natural selection. Major trends in the origin of higher categories- Micro and macro evolution. The evolutionary time scale; Eras, periods and epoch; Major events in the evolutionary time scale. Origin and Evolution of Economically important unicellular and multicellular organisms, plants and animals.

UNIT-V

Molecular Evolution: Concepts of neutral evolution, molecular divergence and molecular clocks; Molecular tools in phylogeny, classification and identification; Protein and nucleotide sequence analysis; origin of new genes and proteins; Gene duplication and divergence. Gene evolution, Evolution of gene families.

REFERENCES

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3. Koto, M. (2000) The Biology of biodiversity, 1st edition, Springer, Japan.
4. Mayer E. - Elements of Taxonomy.
5. Murry J.D. (1993) Mathematical Biology, 2nd edition, Springer-Verlag, New York/Berlin.
6. Simpson, G.G. (1961) Principle of animal taxonomy, Columbia University Press, New York.
7. Snedcor, G.W. and Cochran W.G. (1989) Statistical Methods, Affiliated-East-West Press, New Delhi.
8. Sokal, R.R. and Rohlf F. J. (1995) Biometry the principles and practice of statistics in biological research, 3rd edition, New York W.H. Freeman.
9. Tikadar B.K. Threatened Animals of India, ZSI Publication, Calcutta
10. Wilson, E.O. (1988) Biodiversity, National Academy Press, Washington, D.C.