

Course Code : ENCM 41574
Title : Ecological Interactions and Behavioural Ecology
Pre-requisite : ENCM 21542
Co-requisite : None
Status : Compulsory, Theory cum Practical

Learning outcomes:

After completion of the course unit, the student will be able to;

- determine the community structure using diversity indices,
- discuss the effect of dominant, keystone and foundation species on the community structure
- discuss the effect of biogeographic factors on the community structure,
- discuss the competition, predation, symbiotic relationships, pathogens and zoonotic diseases in animal communities,
- discuss the functional significance of foraging, territorial and mating behaviour,
- explain the social organization of aquatic mammals, canids and felids, elephants, primates and ungulates in relation to their ecology,
- demonstrate skills in analyzing food habits of mammals and birds in relation to their morphology,
- carry out ecological surveys in rivers/streams and rocky/sandy shore ecosystems, and
- demonstrate skills in studying play behaviour, aggression, anti-predatory behaviour and territorial behaviour of some animals in a scientific manner.

Course content:

Ecological Interactions: Community ecology; Habitat, niche and multidimensional niche theory. Diversity and trophic structure in communities; species diversity and analysis of community structure using diversity indices, Trophic structure of a community and limits on food chain length, Impact of dominant, keystone and foundation species on the community structure, Bottom-up and top-down control of food chains. Biogeographic factors affecting community diversity; latitudinal gradients, area effects and the Island Equilibrium Model.

Community interactions: Competition; types of competition, the competitive exclusion principle, temporal and spatial partitioning of resource, Character displacement (morphological resource partitioning). Predation and herbivory; Predator-prey relationships including predator and prey strategies. Symbiotic community interactions; parasitism, mutualism, and commensalism. Ecology of disturbance and patch dynamics, Intermediate disturbance hypothesis. Ecological succession. Pathogens and zoonotic diseases on animal communities. Community assembly theory and ecology of habitat selection.

Behavioural Ecology: Functional significance of behaviour; Optimality theory and quantification of optimal behaviour through cost-benefit analysis, Measurement of function of behaviour. Foraging behaviour; Feeding tactics in animals including feeding at different trophic levels, modifying food supply, trapping and detecting food, tool use and co-operate hunting, Abundance and availability of food and search image formation. Ecology of reproduction; Mating behaviour, sexual selection and mate choice, Mating systems, Inclusive fitness, infanticide, altruism and kin selection, Parental care. Game theory. Social organization of aquatic mammals, canids and felids, elephants, primates and ungulates in relation to their ecology. A generalized model to explain the social organization of higher animals. Genetic basis and evolution of behaviour.

Practical sessions on: Study of food habits of mammals and birds in relation to their morphology, Field survey to study ecological interactions in a river/stream ecosystem, Field survey to study ecological interactions in a rocky shore intertidal ecosystem, Field study on the play behaviour of dogs, Laboratory study on the aggressive and anti-predatory behaviour of fishes, Territorial behaviour of dogs.

Method of teaching and learning:

A combination of lectures, laboratory and field practical sessions, computer based learning, self-studies, assignments and small group discussions.

Assessment Strategy: Continuous assessment and end of semester examination. Percentage given for each sub component indicates the percent contribution to the final marks.			
Continuous Assessment 30 %		Final Assessment 70 %	
Details:		Theory	Practical
Seminar	10	70	-
Lab reports	10		-
Assignments	10		

Recommended reading:

1. Alcock, J. (2005). *Animal behaviour: An evolutionary approach*. Sinauer Associates Publishers, Massachusetts.
2. Hauer, E. F. & G. A. Lamberti (2007). *Methods in Stream Ecology*. Academic Press.
3. Krebs, J. R. & N.B. Davies (1993). *Behavioural ecology*. Blackwell.
4. Osborne, P. L. (2000). *Tropical Ecosystems and Ecological Concepts*. Cambridge University Press.
5. Raven, P. H. & G. B. Johnson (2010). *Biology*. 8th Edition. Tata McGraw-Hill Edition
6. Reece, J. B., L. A. Urry, M. L. Cain, S. A. Wasserman, P. V. Minorsky & R. B. Jackson (2011). *Campbell Biology*, Global Edition. 9th Edition. Pearson Education Inc.

