IISER Pune - Course Content

Semester	JAN 2025
Open to Semester	6,8,12,14,22
Course Code	BI3234
Course title	Animal Behaviour
Nature of Course	LE - Lecture
Credit	4
Coordinator and participating faculty (if any)	**Dr. Raghav Rajan**
Pre-requisites	None.
Objectives	Animals sense the environment and their own internal state and respond with a variety of different behaviors that are appropriate for the situation. How and why do animals produce their different behaviors? As part of this course, students will be introduced to the scientific study of animal behavior with diverse examples from the animal kingdom. Half the course will deal with understanding the evolutionary approach to understanding *why* animals behave the way they do. The other half of the course will deal with how neurons, neural circuits, genes control *how* animals behave the way they do. Both of these are inter-related and both are essential for a better understanding of the subject. Material from both sections of the course will be interleaved during the course with a few weeks of studying the *why* and a few weeks of studying the *how* of animal behavior. Students will also be introduced to the methods used to study both aspects. Having taken the course, students can expect to learn the following: • Learn the basic steps of the scientific method - the process of making hypothesis, predictions and designing experiments to answer questions. • Understand the methods used to study questions about *how* and *why* animals behave the way they do • Understand and be able to apply the evolutionary approach to addressing *why* animals perform behaviors • Understand and be able to describe how neural circuits/genes interact to produce specific natural behaviors (for a few different example behaviors that will be discussed) Anyone curious about animal behavior will find this course

	useful. In addition, the study of animal behavior is useful to a number of other fields including conservation biology, evolution, ecology, neuroscience, etc...
Course content	1. Introduction to the scientific method and addressing questions in animal behavior (1-2 lectures) 2. Tinbergen's four questions (1 lecture) 3. Phylogenetic analysis and game theory (4 lectures) 4. Sampling methods - 2 lectures 5. Intro to neurophysiology - 2-3 lectures 6. Proximate questions in animal behaviour with discussion of the specific models - 15 lectures. Some models that will be discussed are given below. This is subject to some change. a) prey discrimination by the toad b) sound localization by barn owls c) sound production by crickets d) song production in songbirds 7. Ultimate mechanisms of behaviour and the evolutionary approach to studying behaviour (~15 lectures). Some topics that will be discussed are given below. Some topics are subject to change. a) Behavioral ecology and sociobiology – group selection theory, kin selection, altruistic behavior b) Social and cultural transmission of Behavior c) Evolution of anti-predator behaviour, feeding behaviours and communication d) Evolutionary ecology of reproductive behavior, mating systems and parental care in animals
Evaluation / Assessment	Midsem exam - 30% Endsem exam - 30% Others - 40% Others includes semester-long project, quizzes and other assignments
Suggested readings	1. Behavioral Neurobiology: An Integrative Approach. (Second Edition 2010) Gunther K Zupanc. Oxford University Press 2. Animal Behavior: An Evolutionary Approach (Tenth edition 2013) John Alcock. Oxford University Press
When Next	Jan 2026
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