

Part A: Introduction			
Program: <b>Certificate course</b>		Class: <b>B.Sc. III<sup>rd</sup> Year</b>	Year: <b>2024</b> Session <b>2024:2025</b>
1	Course code	<b>ZOOL: 5T</b>	
2	Course Title	Animal Behaviour, Chronobiology and Ecology	
3	Course type	Theory	
4	Pre requisite	NO	
5	Course learning Out comes (CLO)	<p>After successfully completing this course, the students will be able to:</p> <ul style="list-style-type: none"> <li>• Learn a wide range of theoretical and practical techniques used to study animal behaviour.</li> <li>• Develop skills, concepts and experience to understand all aspects of animal behaviour.</li> <li>• Objectively understand and evaluate information about animal behaviour and ecology encountered in our daily lives.</li> <li>• Understand and be able to objectively evaluate the role of behaviour in the protection and conservation of animals in the wild.</li> <li>• Consider and evaluate behaviour of all animals, including humans, in the complex ecological world, including the urban environment.</li> <li>• Know the evolutionary and functional basis of animal ecology.</li> <li>• Understand what makes the scientific study of animal ecology a crucial and exciting endeavour.</li> <li>• Analyse a biological problem, derive testable hypotheses and then design experiments and put the tests into practice.</li> <li>• Solve the environmental problems involving interaction of humans and natural systems at local or global level.</li> </ul>	
6	Credit value	4	
7	Total Marks	Max. Marks: 50	Minimum. Passing Marks: 17

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13.6.2022

<b>Part B : Content of Course</b>		
Total Periods: 60		
<b>Unit</b>	<b>Topics</b>	<b>No. of Period</b>
I	<b>Concept and pattern and control of behaviour</b> Animal behaviour: Scope and importance of study. Concept of behaviour : Motivation, Fixed action of pattern, sign stimulus, Innate releasing mechanism, Action specific energy, Physiological Basis, Learning, Imprinting, Behavioural Genetics, and Evolution of Behaviour. Patterns of behaviour : Kinds of behaviour: foraging behaviour, Territorial behaviour. Mate selection and courtship behaviour. Parental care, Defensive behaviour. Stereotyped Behaviours : Orientation: Kinesis and taxes and Simple Reflex. Neural control And Hormonal Control of Behaviour.	12
II	<b>Innate; Learning behaviour and socio:biology</b> Innate behaviour: communication by sound (cricket vocalizations), Bird song, Echolocation in Bat. Chemical Signalling: Pheromones (types of pheromones) and bee Dance. Schooling behaviour in fish and Flocking Behaviour in Birds. Types of learning: Habituation, Imprinting and types of imprinting :filial and sexual, Classical conditioning, Instrumental learning, Latent learning and Trial and error learning, insight learning. Social behaviour : aggregation, group selection, kin selection, altruism.	14
III	<b>Chronobiology :</b> Biological clocks, biological rhythms: Circadian and circannual rhythms. Tidal, solar and lunar rhythms, entrainments. Biological oscillation. The concept of Average, amplitude, phase and period. Role of melatonin. Applications of Chronobiology: Chrono pharmacology, Chrono medicine, Chronotherapy. Migratory behaviour in birds and fishes.	11
IV	<b>An overview of ecology, ecosystems and population ecology</b> Structure and function of ecosystem: Major ecosystems of the world. Law of limiting factors. Ecological succession. Energy flow in ecosystem, food chain and food web. Recycling of nutrients: C, N, P & S cycle. Ecology of populations: Density, natality, mortality, Fertility and fecundity, survivorship curves. Unique and group attributes of population: mortality, age ratio and age pyramid, sex ratio, dispersal. Factors regulating population dispersal and growth: Exponential and logistic growth. Population regulation: Density:dependent and independent factors; r and K strategies.	12

V	<b>Biotic community, environmental degradation:</b> Community characteristics: stratification; dominance, diversity, species richness, abundance, evenness, similarity. diversity and food:web indices. ecotone and edge effect. Types of interaction: Positive interactions: commensalism, proto:cooperation, and mutualism. Negative interactions: parasitism and allelopathy; predation and predator:prey dynamics; herbivory. Interspecific competition and coexistence. Environmental ethics; Pollution: Air, water and noise pollution and their control. Natural resources, Mineral, water and forest, their significance and conservation. Types of biodiversity, Hotspots, benefit and threat of conservation strategies.	11
Key words – Innate and Learning Behaviour, Sociobiology, Biological clock, Circadian rhythm, Population, Community, Succession, Pollution, Biological interaction, Biodiversity.		

<b>Part : C Learning Resource</b>	
<b>Text books, Reference Books, Other Resources:</b> <ol style="list-style-type: none"> <li>1. McFarland, D. (1999) Animal Behaviour (3rd edition) Pitman Publishing Limited, London, UK.</li> <li>2. Manning, A. and Dawkins, M. S. (2012) An Introduction to Animal Behaviour (6th edition) Ca</li> <li>3. Alcock, J. (2005) Animal Behaviour (8th edition) Sinauer Associate Inc., USA.</li> <li>4. Sherman, P. W. and Alcock, J. (2013) Exploring Animal Behaviour (6th edition) Sinauer Associate Inc., Massachusetts, USA.</li> <li>5. Dunlap, J. C.; Loros, J.J. and DeCoursey, P. J. (2009) Chronobiology Biological Timekeeping (1st edition) Sinauer Associates, Inc. Publishers, Sunderland, MA, USA.</li> <li>6. McFarland, D. (1999) Animal Behaviour (3rd edition) Pitman Publishing Limited, London, UK.</li> <li>7. Manning, A. and Dawkins, M. S. (2012) An Introduction to Animal Behaviour (6th edition) Ca</li> <li>8. McFarland, D. (1999) Animal Behaviour (3rd edition) Pitman Publishing Limited, London, UK.</li> <li>9. Manning, A. and Dawkins, M. S. (2012) An Introduction to Animal Behaviour (6th edition) Ca</li> <li>10. Alcock, J. (2005) Animal Behaviour (8th edition) Sinauer Associate Inc., USA.</li> <li>11. McFarland, D. (1999) Animal Behaviour (3rd edition) Pitman Publishing Limited, London, UK.</li> <li>12. Manning, A. and Dawkins, M. S. (2012) An Introduction to Animal Behaviour (6th edition) Ca</li> <li>13. McFarland, D. (1999) Animal Behaviour (3rd edition) Pitman Publishing Limited, London, UK.</li> </ol>	



14. Manning, A. and Dawkins, M. S. (2012) An Introduction to Animal Behaviour (6th edition) Ca
15. Alcock, J. (2005) Animal Behaviour (8th edition) Sinauer Associate Inc., USA.
16. Sherman, P. W. and Alcock, J. (2013) Exploring Animal Behaviour (6th edition) Sinauer Associate Inc., Massachusetts, USA.
17. Dunlap, J. C.; Loros, J.J. and DeCoursey, P. J. (2009) Chronobiology Biological Timekeeping (1st edition) Sinauer Associates, Inc. Publishers, Sunderland, MA, USA.
18. Kumar, V. (2002). Biological Rhythms: Narosa Publishing House, Delhi/ Springer : Verlag, Germany. mbridge, University Press, UK
19. Colinviaux, P. A. (1993) Ecology (2nd edition) Wiley, John and Sons, Inc.
20. Krebs, C. J. (2001) Ecology (6th edition) Benjamin Cummings. 57
21. Odum, E.P., (2008) Fundamentals of Ecology. Indian Edition. Brooks/Cole.
22. Ricklefs, R.E. (2000) Ecology (5th edition) Chiron Press.
23. Southwood, T.R.E. and Henderson, P.A. (2000) Ecological Methods (3rd edition) Blackwell Sci.
24. Kendeigh, F C. (1984) Ecology with Special Reference to Animal and Man. Prentice Hall Inc.
25. Stiling, P. D. (2012) Ecology Companion Site: Global Insights and Investigations. McGraw Hill Education.

#### **E:Resources:**


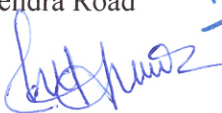
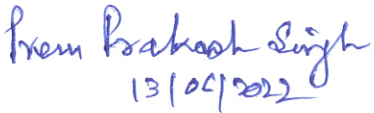
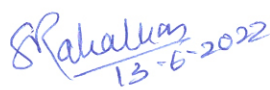

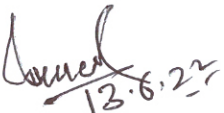
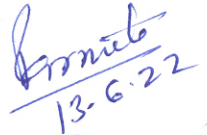


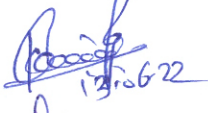
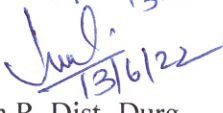
1. SWAYAM: <https://swayam.gov.in/explorer?searchText=>
2. <https://academic.oup.com>
3. <https://medineplus.gov>
4. <https://ncin.nlm.nih.gov>
5. <https://zoologylearningpoint.woodpress.com>
6. <https://zoologyresources.com>
7. National digital library – <https://ndl.iitkgp.ac.in>
8. e:PG Pathshala (MHRD) Portal, <https://egpg.inflibnet.ac.in>
9. Science Direct Open Access Content
10. [https://www.sciencedirect.com/book/9781843342038/ open Access](https://www.sciencedirect.com/book/9781843342038/openAccess)
11. <https://egyankosh.ac.in>
12. <https://Sciencedirect.com>
13. <https://Britannica.com> > science > animal :behaviour
14. <https://www.nontesonzoology.com> > animal behaviour
15. <https://www.biologyonline.com>
16. <https://www.sciencing.com> > Science > Biology > Ecology
17. <https://www2.hcmuf.edu.vn>
18. <https://www.researchgate.net>

#### **Part D: Assessment and Evaluation**

University Exam(UE): Maximum Marks: 50 Marks

## DECLARATION

This is to certify that the syllabus is framed by the central board of study (Zoology) as per the guidelines of the department of higher education, Chhattisgarh government.

1. Dr. K. R. Sahu - Chairman -  
Assistant Professor, Govt. Pandit Madhav Rao Sapre College, Pendra Road   
13-6-2022
2. Dr. Ajit Hundet - Member -  
Professor, Govt. D. B. Girls College, Raipur   
13-6-2022
3. Dr. Prem Prakash Singh - Member -  
Professor, Govt. College, Kusmi, Balrampur   
13/06/2022
4. Dr. Shubhada Rahalkar - Member -  
Professor, Govt. Bilasa Girls P. G. College, Bilaspur   
13-6-2022
5. Dr. Anil Kumar Shrivastava - Member -  
Professor, Govt. V. Y. T. P. G. Autonomous College, Durg 
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10. Dr. Rajesh Kumar Rai - Member -  
Assistant Professor, Govt. Mahamaya College, Ratanpur, Bilaspur   
13.6.22
11. Dr. Hema Kulkarni - Member -  
Assistant Professor, Shahid Domeswar Sahu Govt. College, Jamgaon R. Dist -Durg   
13/6/22

Date : 13.06.2022.