SOPHIA COLLEGE FOR WOMEN

(EMPOWERED AUTONOMOUS)

Affiliated to the University of Mumbai

Programme: Sciences

Zoology (Minor)

Syllabus for the Academic Year 2025-2026

based on the National Education Policy 2020

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COURSE DETAILS FOR MINOR:

	SEMESTER 5		SEMESTER 6
TITLE	**Ethology**		**Histology**
TYPE OF COURSE - DSC	**Minor**		**Minor**
CREDITS	**2**		**2**

Preamble:

This syllabus of Zoology Program offered by Sophia College for Women, Mumbai has been designed for the academic year 2025-2026; under the National Education Policy 2020 implemented from the academic year 2023-24.

The syllabus tries to encompass fundamental areas such as taxonomy, developmental biology, genetics, physiology, cell biology as well as applied zoology disciplines like ecology and economic zoology that would promote skill enhancement and entrepreneurship. The syllabus is planned such that the learners who are beginning their academic journey opting for the subject of Zoology will be equipped with not only the basic knowledge of the animal world but also the recent trends in the subject.

Learning of the subject would involve various innovative pedagogies such as experiential learning, problem-based learning, collaborative learning in addition to the traditional mode of learning. Besides sensitizing the learners towards environment and sustainability, the subject also offers career opportunities in a variety of fields such as conservation, research, education, and animal management. Due care would be taken to adhere to the directions as given in the UGC Circular F14-4/2006 (CPP-II) while conducting practicals involving animal types.

PROGRAMME OBJECTIVES

PO 1	To provide a holistic knowledge about animal biology such as taxonomy, comparative anatomy and physiology, behaviour, ecology and evolution.
PO 2	To develop experimental and research-oriented skills for future career in academia
PO 3	To gain field-based knowledge through experiential learning
PO 4	To get acquainted with the applied areas of zoology to promote employability and entrepreneurship
PO 5	To encourage understanding about the importance of biodiversity conservation, the threats facing ecosystems and the conservation measures used to preserve wildlife

PROGRAMME SPECIFIC OUTCOMES

PSO 1	Apply the field-based and the in-class knowledge of animal biology to identify and classify the animals in their natural habitat upto class level
PSO 2	Identify the various types of animal behaviour, and animal interactions with the ecosystem
PSO 3	Conduct basic research that involves application of critical thinking and experimental skills

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PSO 4	Get career opportunities in a variety of fields such as conservation, research, education, and animal management

Programme: Science **Zoology Minor**	**Semester – 5**
Course Title: Ethology	**Course Code: SZOO355MN**

COURSE OBJECTIVES:

1. To examine the mechanisms and adaptive value of learned behaviours through key examples and experiments.
2. To explore the biological basis and evolutionary significance of innate behaviours in animals.

COURSE OUTCOMES:

The learner will be able to:

1. Analyze and interpret examples of learned behaviour, such as habituation, imprinting, and classical conditioning, and evaluate their adaptive significance in animal survival and social organization.
2. Describe and explain the mechanisms and evolutionary advantages of innate behaviours, such as fixed action patterns and reflexes, in various animal species.

Lectures per week (1 Lecture is 60 minutes)		**1**	
Total number of Hours in a Semester		**15**	
Credits		**1**	
Evaluation System	**Semester End Examination**	**1Hour**	**25 marks**
	Continuous Assessment	**--**	**–**

UNIT 1	1.1	Introduction to Ethology: 1.1.1: Definition, and Scope of Ethology.	

Ethology (1 Credit)		1.1.2: Animal behaviour: Innate and Learned behaviour. 1.1.3: Types of learning: Habituation, Imprinting and Types of imprinting - Filial and sexual, Classical conditioning. 1.1.4: Instrumental learning.	15 hours
	1.2	Aspects of animal behaviour: 1.2.1 Communication in bees and ants. 1.2.2 Mimicry and colourations. 1.2.3 Displacement activities, ritualization. 1.2.4 Migration in fish, schooling behaviour. 1.2.5 Habitat selection, territorial behaviour.	
	1.3	Social behaviour: 1.3.1 Social behaviour in primates - Hanuman langur 1.3.2 Elements of socio-biology: Altruism and Kinship	
	1.4	Cognitive aspects of learning: 1.4.1 Nature of cognitive process. 1.4.2 Insight learning 1.4.3 Associative learning and representation.	

PRACTICAL	**Semester – 5**
Course Title: Ethology	**Course Code: SZOO355MNP**
COURSE OUTCOMES: The learner will be able to: 1. Perform and interpret key behavioural tests in zebrafish, including habituation, social preference, and anxiety-related assays. 2. Design a behavioural research project and analyze experimental data critically.	
Lectures per week (1 Lecture is 120 minutes)	**1**

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Total number of Hours in a Semester		**30**	
Credits		**1**	
Evaluation System	**Semester End Examination**	**2 Hours**	**25 marks**
	Continuous Assessment	**--**	**--**

	1	Study of migration and schooling behaviour in fish	30 hours
	2	Study of flocking in birds and herding in mammals	
	3	Study of territorial behaviour in animals - Siamese Fighting Fish, Indian Garden Lizard, Indian Peafowl, Bengal Tiger	
	4	Study of types of social groups in mammals - Solitary (Leopard), Pair-living (Indian fox), Nuclear Family Groups (Indian wild dog), Matrilineal Groups (Asian elephant), One-male Multi-female groups (Hanuman langur), Multi-male, Multi-female groups (Rhesus macaque), Fission-Fusion Societies (Sloth Bear), Male Coalitions (Asiatic Lion)	
	5	Study of novel tank diving behaviour	
	6	Study of aggression using mirror biting test	
	7	Study of communication in honeybees	

	8	Study of mimicry and colouration in animals	
	9	Study of phototaxis in Drosophila – colour preference	
	10	Study of nesting behaviour in birds	
	11	Study of bird calls	
	12	Project on animal behaviour	
	13	Field study: Visit to zoological garden to observe behaviour in animals	

Note: All the practicals will be conducted using available model systems

ASSESSMENT DETAILS:

I. Summative Assessment (Theory): 25 marks
II. Summative Assessment (Practicals): 25 marks

REFERENCES:

1. Arora M. (2019). *Animal Behaviour*. (8th ed.). Himalaya Publications.
2. Eibl-Eibesfeldt, I. (1970). *The biology of Behaviour. Ethology*. Holt, Rineheart & Winston Publication, New York.
3. Manning A. and Dawkins M.S. (2012). *An introduction to Animal Behaviour* (6th ed.). Cambridge University Press.
4. McFarland D. (1999). *Animal Behaviour Psychobiology, Ethology and Evolution*. (3rd ed.). Longman

Publication.

5. Vessey S., Jacob E., Vessey S. H. and Drickamer L. C. (2002). *Animal Behaviour: Mechanisms, Ecology and Evolution*. (5th ed.). McGraw-Hill.

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Programme: Sciences **Zoology Minor**		**Semester – 6**	
Course Title: Histology		**Course Code: SZOO366MN**	
COURSE OBJECTIVES: 1. To introduce the learner to histological structure / normal tissue architecture of some of the endocrine and exocrine glands 2. To provide learners with conceptual knowledge of common histopathological changes in the diseased condition			
COURSE OUTCOMES: The learner will be able to: 1. Describe and sketch the general histological features of various organs 2. Interpret the histopathogical changes observed in the organs due to disease condition			
Lectures per week (1 Lecture is 60 minutes)		**1**	
Total number of Hours in a Semester		**15**	
Credits		**1**	
Evaluation System	**Semester End Examination**	**1 Hour**	**25 marks**
	Continuous Assessment	**--**	**-**

UNIT 1 General Histology and histopathology (1 Credit)	1.1	Liver: - General histology - Histopathological changes observed in hepatotoxicity	15 hours
	1.2	Kidney: - General histology	

		- Histopathological changes observed in nephrotoxicity	
	1.3	Pancreas: - General histology - Histopathological changes observed in pancreatitis	
	1.4	Adrenal: - General histology - Histopathological changes observed in adrenopathy	
	1.5	Pituitary: - General histology - Histopathological changes observed in pituitary adenoma	
	1.6	Thyroid: - General histology - Histopathological changes observed in thyroid tumours	

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PRACTICAL	**Semester – 6**
Course Title: Histology	**Course Code: SZOO366MNP**

COURSE OUTCOMES:
The learner will be able to:

1. Perform pre-microtechnique procedures
2. Prepare permanent slides of the tissue section with the help of microtechnique
3. Identify histopathological changes at tissue level of certain organs

Lectures per week (1 Lecture is 120 minutes)		**1**	
Total number of Hours in a Semester		**30**	
Credits		**1**	
Evaluation System	**Semester End Examination**	**2 Hour**	**25 marks**
	Continuous Assessment	**--**	

	1	Study of histology of glands: T.S. of pituitary, thyroid, liver, kidney, pancreas, adrenal gland (permanent slides)	30 hours
	2	Instrumentation for tissue processing, sectioning and staining	
	3	Types of fixatives and various fixation techniques	
	4	Different types of stains used in various staining techniques	

	5	Tissue preservation and fixation, dehydration	
	6	Infiltration, paraffin embedding and block preparation	
	7	Preparing the tissue sections on microtome	
	8	Visit to pathology laboratory to understand the histopathological investigations	

ASSESSMENT DETAILS:

I. **Summative Assessment (SA) of Theory Course: 25 marks**
II. **Summative Assessment (SA) of Practical: 25marks**

REFERENCES:

1. Bailey, F. R., Copenhaver, W. M., Kelly, D. E., & Wood, R. L. (1978). Bailey's Textbook of Histology. (17th ed.). Williams & Wilkins.
2. O'Dowd, G., Bell, S., & Wright, S. (2019). Wheater's Pathology: A Text, Atlas and Review of Histopathology. (6th ed.). Churchill Livingstone.