UNIVERSITY OF MADRAS

B.Sc. DEGREE PROGRAMME IN ADVANCED ZOOLOGY AND BIOTECHNOLOGY

SYLLABUS WITH EFFECT FROM 2023-2024

SEMESTER - II

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
121C2A	**CHORDATA**	Core	Y	-	-	-	5	6	25	75	100

Learning Objectives	
CO1	To understand the structures and distinct features of Phylum Chordata.
CO2	To understand and able to distinguish the characteristic features of each subphylum and class.
CO3	To appreciate functional adaptations in different vertebrates
CO4	To know about the diversity of vertebrates
CO5	To understand the evolutionary position of different groups of vertebrates

UNIT	Details	No. of Hours	Course Objectives
I	**General Characters and Classification of Phylum ProtoChordata andChordata.** Origin of Chordata, General Characters ,Type study – Amphioxus., Affinities and Systematic position of Hemichordata (*Balanoglossus*), Urochordata (*Ascidia*), Cephalochordata (*Amphioxus*).	18	CO1, CO2
II	**Vertebrates and Agnatha**: Characteristics Classification upto Classes, affinities, Agnatha –Type study-*Petromyzon*, - Pisces- Type study-*Scoliodon sorrakowah*. Accessory respiratory organs - Parental care – Migration.	18	CO1, CO2, CO4, CO5
III	**Amphibia** : General characters and classification .Type study - *Rana hexadactyla* - Adaptive features of Anura, Urodela and Apoda - Neoteny in Urodela - Parental care in Amphibia.	18	CO1, CO2, CO3, CO4, CO5
IV	**Reptilia** : General characters and classification - Type study – *Calotes versicolor (endoskeleton of Varanus*) - Extinct reptiles. Snakes of India. Poison apparatus and biting mechanism of poisonous snakes . Identification of poisonous and non poisonous snakes.	18	CO1, CO2, CO4, CO5

V	**Aves :** General characters and classification – Type study - *Columba livia*,Flight adaptations, Migration. Birds are glorified reptiles- connecting link- archeopteryx **Mammalia:** General characters and classification - Type study - Rabbit - Adaptive radiation in mammals - Egg laying mammals, Aquatic mammals, Dentition in mammals.	18	CO1, CO2, CO4, CO5
	Total	**90**	

Course Outcomes

Course Outcomes	On completion of this course, students will;	
CO1	Classify, Identify and recall the name and distinct features of different subphylum belonging to phylum Chordata.	PO1
CO2	Explain, and relate the origin, structural organization and evolutionary aspects of vertebrates.	PO1, PO3
CO3	Analyze, compare and distinguish the developmental stages and describe the important biological process.	PO3, PO4, PO5
CO4	Correlate the different modes of life and parental care among different vertebrates.	PO3, PO5, PO6
CO5	Summarise the morphology and ecological adaptations in vertebrates and list out the economic importance.	PO3, PO5, PO8

Text Books
(Latest Editions)

1.	Ayyar, E.K. and T.N. Ananthakrishnan, 1992. Manual of Zoology Vol. II (Chordata), S. Viswanathan (Printers and Publishers) Pvt Ltd., Madras, 891p.
2.	Jordan, E.K. and P.S. Verma, 1995. Chordate Zoology and Elements of Animal Physiology, 10th edition, S. Chand & Co Ltd., Ram Nagar, New Delhi, 1151 pp.
3.	Nigam, H.C., 1983. Zoology of Chordates, Vishal Publications, Jalandhar - 144008, 942.
4.	Ganguly, Sinha,. Bharati Goswami and Adhikari, 2004. Biology of animals Vol.II - New central book Agency (p) Ltd.
5.	Kotpal. R.L. A, Modern text book of Zoology Vertebrates- Rastogi publications. 2009

References Books (Latest editions, and the style as given below must be strictly adhered to)		
1.	Darlington P.J. The Geographical Distribution of Animals, R.E. Krieger Pub. Co.	
2.	Hall B.K. and Hallgrimsson B. (2008). Strickberger's Evolution. IV Edition. Jones and Bartlett Publishers Inc.	
3.	Hickman, C.P. Jr., F.M.Hickman and L.S. Roberts, 1984. Integrated Principles of Zoology, 7th Edition, Times Merror/Mosby College Publication. St. Louis. 1065 pp.	
4.	Newman, H.H., 1981. The Phylum Chordata, Satish Book Enterprise, Agra – 282 003, 477 pp.	
5.	Parker and Haswell, 1964. Text Book of Zoology, Vol II (Chordata), A.Z.T,B.S. Publishers and Distributors, New Delhi - 110 051, 952 pp.	
6.	Pough H. Vertebrate life, VIII Edition, Pearson International.	
7.	Waterman, Allyn J. et al., 1971. Chordate Structure and Function, Mac Millan & Co., New York, 587 pp.	
8.	Young, J. Z. (2004). The Life of Vertebrates. III Edition. Oxford university press.	
Web Resources		
1.	http://tolweb.org/Chordata/2499	
2.	https://www.nhm.ac.uk/	
3.	https://bit.ly/3Av1Ejg	
4.	https://bit.ly/3kqTfYz	
5.	https://biologyeducare.com/aves/	
6.	https://www.vedantu.com/biology/mammalia	
Methods of Evaluation		
Internal Evaluation	Continuous Internal Assessment Test	25 Marks
	Assignments	
	Seminars	
	Attendance and Class Participation	
External Evaluation	End Semester Examination	75 Marks
	Total	100 Marks

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Methods of Assessment	
Recall (K1)	Simple definitions, MCQ, Recall steps, Concept definitions
Understand/ Comprehend (K2)	MCQ, True/False, Short essays, Concept explanations, Short summary or overview
Application (K3)	Suggest idea/concept with examples, Suggest formulae, Solve problems, Observe, Explain
Analyze (K4)	Problem-solving questions, Finish a procedure in many steps, Differentiate between various ideas, Map knowledge
Evaluate (K5)	Longer essay/ Evaluation essay, Critique or justify with pros and cons
Create (K6)	Check knowledge in specific or offbeat situations, Discussion, Debating or Presentations

Mapping with Programme Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1	S							
CO 2	M		S					
CO 3		M	S	S	S	S		S
CO 4			S	S	S	M		
CO 5			S		S			S

S-Strong(3) M-Medium (2) L-Low (1)