

INDIRA GANDHI UNIVERSITY, MEERPUR-REWARI, HARYANA-122502

(A State University Established under Haryana Act No.29 of 2013)

(Recognized u/s 12(B) & 2(f) of UGC Act, 1956)

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Scheme of Examination for Zoology Subject in

Under Graduate Programmes

as per NEP 2020

**Curriculum and Credit Framework for Undergraduate Programmes
(Multiple Entry-Exit, Internships and Choice Based Credit System LOCF)**

With effect from the session 2026-27 (in phased manner)

**Department of Zoology
Indira Gandhi University
Meerpur-Rewari (122502)
Haryana, India**

Details of Approvals

Council/Board	Date	Remark
Staff Council		
Board of Studies		
Faculty		
Academic Council		
Year of implementation		

Chairperson
(Signature with Stamp)

VISION AND MISSION OF THE UNIVERSITY

VISION

To be a globally renowned university, recognized for excellence in teaching, innovative research, and welfare of the society, imbining the spirit of “*Vasudhaiv kutumbkam*”.

MISSION

- To introduce and implement innovation in teaching and learning process matching up the global standards to strengthen academic delivery through curriculum design, teaching pedagogy and usage of ICT.
- To develop a mechanism that attracts talented, qualified and experienced faculty from across the globe for pursuing their academic and research careers at the University.
- To offer academic programs at UG, PG, doctoral, Post-Doctoral levels which are learner-centric, industry focused, and adhere to outcome based international models.
- To create an ambiance that is conducive for undertaking sponsored research, innovation and consultancy services to a wide spectrum of societal and industrial requirements while encouraging interdisciplinary approach of learning, team work, and research.
- To establish state of art centres of excellence in frontier areas of research and design innovation through industry collaboration to innovate and incubate the products and services.
- To establish smart campus and promote e-governance activities in the university for the digitally empowered society and knowledge economy.
- To provide a hygienic, modern, environment friendly and vivacious campus attuned to the urgent needs of Green Technology.
- To consider and implement norms, metrics, standards, procedures and benchmarks for assessing and improving the quality in every aspect of University system and achieve quality certifications by National and International bodies.
- To make society self-reliant by organizing various programmes including literacy, gender sensitization, health awareness, and dissemination of information about livelihood generation.

MINIMUM ELIGIBILITY CRITERIA

A candidate who has passed Senior Secondary (10+2) examination of Board of School Education Haryana, Bhiwani with 45% marks in aggregate.

OR

Any other examination recognised by this University as equivalent thereto.

The candidate seeking admission to B.Sc. (Medical group) Sem-I should have passed the above-mentioned examination with English, Physics, Chemistry & Biology.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	Core Competence & Practical Application Graduates will actively contribute to scientific, industrial, or educational sectors by applying their foundational knowledge, technical data management skills, and practical lab techniques to support ongoing projects and resolve standard operational challenges.
PEO 2	Continued Education & Professional Growth Graduates will continue to build upon their undergraduate foundation by successfully pursuing higher education (such as Master's or professional degree programs), specialized certifications, or continuous workplace training.
PEO 3	Teamwork & Technical Communication Graduates will function effectively as collaborative and dependable team members in diverse environments, assisting in the execution of technical projects and clearly communicating scientific results to peers and supervisors.
PEO 4	Professional Ethics & Social Awareness Graduates will uphold ethical standards and professional integrity in their daily tasks, maintaining an awareness of how their scientific practices and technical contributions impact the environment and local communities.

PROGRAMME OUTCOMES (POs)

PLO 1	Disciplinary Knowledge:	Apply fundamental concepts, principles, and theories of the discipline to understand phenomena and their applications.
PLO2	Effective Communication:	Communicate ideas, methods, and results effectively through oral, written, graphical, and digital formats.
PLO3	Teamwork & Collaboration:	Function effectively as an individual, team member, or leader in multidisciplinary and collaborative environments.
PLO4	Social Responsibility & Ethical Awareness:	Apply methods and reasoning appropriate to the discipline to assess issues related to society and the consequent responsibilities relevant to professional practice.
PLO5	Lifelong Learning:	Engage in self-directed learning and adapt to emerging knowledge, technologies, and professional demands throughout life.
PLO6	Integrity & Professional Ethics:	Demonstrate integrity, ethical conduct, and professional responsibility in academic, research/practice, and professional activities.
PLO7	Scientific Inquiry and Research Skills:	Apply the scientific method to identify problems, conduct experiments or theoretical investigations, collect and analyze data, and interpret results using appropriate scientific approaches.
PLO8	Problem Solving:	Identify, analyze, and solve scientific problems using logical reasoning, quantitative methods, and appropriate scientific tools and techniques.
PLO9	Critical and Analytical Thinking:	Evaluate scientific information critically, interpret experimental data, and draw evidence-based conclusions using analytical reasoning.
PLO10	Laboratory Skills and Scientific Tools:	Demonstrate proficiency in the safe and effective use of laboratory techniques, scientific instruments, and modern tools relevant to life sciences.
PLO11	Application of Life Sciences Knowledge:	Apply principles of life sciences to understand biological systems, address environmental and health-related challenges, and undertake basic project-based or field-based investigations.

Indira Gandhi University, Meerpur, Rewari

Scheme of Examination for the Zoology Subject in Under Graduate Programmes

as per NEP 2020 Curriculum and Credit Framework for Undergraduate Programmes

(Multiple Entry-Exit, Internships and Choice Based Credit System LOCF) with effect from the session 2026-27 (in a phased manner)

Semester-1

Course Type	Applicable Scheme	Course Code	Nomenclature of the Course	Credits			Contact hours L: Lecture P: Practical T: Tutorial				Internal Assessment Marks		End term Examination Marks		Total Marks	Examination hours	
				Total	Theory (Th)	Practical (P)	L	T	P	Total	Th	P	Th	P		Th	P
CC-1 MCC-1	Scheme A, B & C	26L4.5-ZOO-101	Diversity of Non-Chordates	4	3	1	3	0	2	5	25	5	50	20	100	3	2
MCC-2	Scheme C	26L4.5-ZOO-102	Type study of Non-chordates	4	3	1	3	0	2	5	25	5	50	20	100	3	2
*CC-M1	Scheme A & B	26L4.5-ZOO-103	Introduction of Non-Chordates	2	1	1	1	0	2	3	5	5	20	20	50	2	2
CC-M1	Scheme C	From Available CC-1/MCC-1 of 4 credits as per NEP															
MDC 1	Scheme A, B, C & D	From Available pool of Multidisciplinary Courses from a subject of different discipline as per NEP.															
AEC-1	A, B & C	From Available pool of Ability Enhancement Courses as per NEP															
SEC-1	A, B & C	From Available pool of Skill Enhancement Courses as per NEP															
VAC-1	A, B & C	From Available pool of Value Added Courses as per NEP															

*For students who opt Zoology as a minor subject

Semester-2

Course Type	Applicable Scheme	Course Code	Nomenclature of the Course	Credits			Contact hours L: Lecture P: Practical T: Tutorial				Internal Assessment Marks		End term Examination Marks		Total Marks	Examination hours	
				Total	Theory (Th)	Practical (P)	L	T	P	Total	Th	P	Th	P		Th	P
CC-2 MCC-3	Scheme A, B & C	26L4.5-ZOO-201	Diversity of Chordates	4	3	1	3	0	2	5	25	5	50	20	100	3	2
DSEC-1	Scheme C	26L4.5-ZOO-202	Applied Zoology	4	3	1	3	0	2	5	25	5	50	20	100	3	2
*CC-M2	Scheme A & B	26L4.5-ZOO-203	Introduction of Chordates	2	1	1	1	0	2	3	5	5	20	20	50	2	2
CC-M2	Scheme C	From Available CC-2/MCC-3 of 4 credits as per NEP															
MDC-2	A, B & C	From Available pool of Multidisciplinary Courses from a subject of different discipline as per NEP															
AEC-2	A, B & C	From Available pool of Ability Enhancement Courses as per NEP															
SEC-2	A, B & C	From Available pool of Skill Enhancement Courses as per NEP															
VAC-2	A, B & C	From Available pool of Value Added Courses as per NEP															
Internship	A, B & C	26L4.5-ZOO-204	Internship of 4 Credits of 4-6 weeks duration after 2 nd Semester (Mandatory in case of exit)												100		

*For students who opt Zoology as a minor subject

Semester-3

Course Type	Applicable Scheme	Course Code	Nomenclature of the Course	Credits			Contact hours L: Lecture P: Practical T: Tutorial				Internal Assessment Marks		End term Examination Marks		Total Marks	Examination hours	
				Total	Theory (Th)	Practical (P)	L	T	P	Total	Th	P	Th	P		Th	P
CC-3 MCC-4	Scheme A, B & C	26L5.0-ZOO-301	Cell Biology and Animal Genetics	4	3	1	3	0	2	5	25	5	50	20	100	3	2
MCC-5	Scheme B & C	26L5.0-ZOO-302	Type study of chordates	4	3	1	3	0	2	5	25	5	50	20	100	3	2
MCC-2	Scheme B	26L5.0-ZOO-102	Type study of Non chordates	4	3	1	3	0	2	5	25	5	50	20	100	3	2
CC-M3	Scheme A & C	From Available CC-3/MCC-4 of 4 credits as per NEP															
CC-M3(V)	Scheme B	From Available pool of Minor (Vocational) Courses VOC-1															
MDC 3	Scheme A, B ,C & D	From Available pool of Multidisciplinary Courses from a subject of different discipline as per NEP															
AEC-3	Scheme A, B & C	From Available pool of Ability Enhancement Courses as per NEP															
SEC-3	Scheme A, B & C	From Available pool of Skill Enhancement Courses as per NEP															
VAC-3	Scheme C only	From Available pool of Value Added Courses as per NEP															

Semester-4

Course Type	Applicable Scheme	Course Code	Nomenclature of the Course	Credits			Contact hours L: Lecture P: Practical T: Tutorial				Internal Assessment Marks		End term Examination Marks		Total Marks	Examination hours	
				Total	Theory (Th)	Practical (P)	L	T	P	Total	Th	P	Th	P		Th	P
CC-4 MCC-6	Scheme A, B & C	26L5.0-ZOO-401	Biomolecules and Mammalian Physiology	4	3	1	3	0	2	5	25	5	50	20	100	3	2
MCC-7	Scheme B & C	26L5.0-ZOO-402	Aquaculture	4	3	1	3	0	2	5	25	5	50	20	100	3	2
MCC-8	Scheme B & C	26L5.0-ZOO-403	Pest Management	4	3	1	3	0	2	5	25	5	50	20	100	3	2
DSE-1	Scheme B & C	26L5.0-ZOO-404	Biodiversity and Wildlife Management	4	3	1	3	0	2	5	25	5	50	20	100	3	2
		OR															
		26L5.0-ZOO-405	Cytogenetics	4	3	1	3	0	2	5	25	5	50	20	100	3	2
CC-M4(V)	A, B & C	From Available pool of Minor (Vocational) Courses VOC-2															
AEC-4	A, B & C	From Available pool of Ability Enhancement Courses as per NEP															
VAC-3	A & B	From Available pool of Value Added Courses as per NEP															
VAC-4	C	From Available pool of Value Added Courses as per NEP															
Internship	A, B & C	26L5.0-ZOO-406	Internship of 4 Credits of 4-6 weeks duration after 4th Semester (Mandatory in case of exit if not done after 2 nd Semester)												100		

Semester-5

Course Type	Applicable Scheme	Course Code	Nomenclature of the Course	Credits			Contact hours L: Lecture P: Practical T: Tutorial				Internal Assessment Marks		End term Examination Marks		Total Marks	Examination hours	
				Total	Theory (Th)	Practical (P)	L	T	P	Total	Th	P	Th	P		Th	P
CC-5 MCC-9	Scheme A, B & C	26L5.5-ZOO-501	Ecology and Environment	4	3	1	3	0	2	5	25	5	50	20	100	3	2
MCC-10	Scheme B & C	26L5.5-ZOO-502	Animal Taxonomy	4	3	1	3	0	2	5	25	5	50	20	100	3	2
DSE-2	Scheme B & C	26L5.5-ZOO-503	Animal Behaviour and chronobiology	4	3	1	3	0	2	5	25	5	50	20	100	3	2
		Or															
		26L5.5-ZOO-504	Comparative Anatomy of Vertebrates	4	3	1	3	0	2	5	25	5	50	20	100	3	2
DSE-3	Scheme B & C	26L5.5-ZOO-505	Biology of Insects	4	3	1	3	0	2	5	25	5	50	20	100	3	2
		Or															
		26L5.5-ZOO-506	Parasitology	4	3	1	3	0	2	5	25	5	50	20	100	3	2
CC-M5(V)	A & C	From Available pool of Minor (Vocational) Courses VOC-1															
Internship	A, B & C	26L5.5-ZOO-507	Internship of 4 Credits of 4-6 weeks duration (After 4 th Semester)												100		

Semester-6

Course Type	Applicable Scheme	Course Code	Nomenclature of the Course	Credits			Contact hours L: Lecture P: Practical T: Tutorial				Internal Assessment Marks		End term Examination Marks		Total Marks	Examination hours	
				Total	Theory (Th)	Practical (P)	L	T	P	Total	Th	P	Th	P		Th	P
CC-6 MCC-11	Scheme A, B & C	26L5.5-ZOO-601	Developmental Biology and Evolution	4	3	1	3	0	2	5	25	5	50	20	100	3	2
MCC-12	Scheme B & C	26L5.5-ZOO-602	Basics of Endocrinology and Immunology	4	3	1	3	0	2	5	25	5	50	20	100	3	2
DSE-4	Scheme B & C	26L5.5-ZOO-603	Reproductive Physiology	4	3	1	3	0	2	5	25	5	50	20	100	3	2
		Or															
		26L5.5-ZOO-604	Neurophysiology	4	3	1	3	0	2	5	25	5	50	20	100	3	2
DSE-5	Scheme B & C	26L5.5-ZOO-605	Molecular Biology	4	3	1	3	0	2	5	25	5	50	20	100	3	2
		Or															
		26L5.5-ZOO-606	Forensic Biology	4	3	1	3	0	2	5	25	5	50	20	100	3	2
CC-M6	A	From Available CC-6/MCC-11 of 4 credits as per NEP															
CC-M5(V)	B	From Available pool of Minor (Vocational) Courses VOC-3															
CC-M6(V)	C																
CC-M7(V)	A																
SEC-4	C	From Available pool of Skill Enhancement Courses as per NEP															

Semester-7 (Honours/Honours with Research)

Course Type	Applicable Scheme	Course Code	Nomenclature of the Course	Credits			Contact hours L: Lecture P: Practical T: Tutorial				Internal Assessment Marks		End term Examination Marks		Total Marks	Examination hours	
				Total	Theory (Th)	Practical (P)	L	T	P	Total	Th	P	Th	P		Th	P
CC-H1	Scheme B & C	26L6.0-ZOO-701	Advances in Cell Biology	4	4	0	4	0	0	4	30	-	70	-	100	3	-
CC-H2	Scheme B & C	26L6.0-ZOO-702	Biochemistry and Biotechniques	4	4	0	4	0	0	4	30	-	70	-	100	3	-
CC-H3	Scheme B & C	26L6.0-ZOO-703	Structure and Function of Invertebrates	4	4	0	4	0	0	4	30	-	70	-	100	3	-
DSE-6	Scheme B & C	26L6.0-ZOO-704	Biosystematics and Biostatistics	4	4	0	4	0	0	4	30	-	70	-	100	3	-
		Or															
		26L6.0-ZOO-705	Computational Biology	4	4	0	4	0	0	4	30	-	70	-	100	3	-
PC-H1	Scheme B & C	26L6.0-ZOO-706	Practical Based on B26-ZOO-701 to B26-ZOO-703 and any one out of B26-ZOO-704 & 705	4	0	4	0	0	8	8	-	30	-	70	100	-	3
CC-HM1	B & C	From Available Core Courses in Minor Subject of 4 credits as per NEP															

Semester-8 (Honours)

Course Type	Applicable Scheme	Course Code	Nomenclature of the Course	Credits			Contact hours L: Lecture P: Practical T: Tutorial				Internal Assessment Marks		End term Examination Marks		Total Marks	Examination hours	
				Total	Theory (Th)	Practical (P)	L	T	P	Total	Th	P	Th	P		Th	P
CC-H4	Scheme B & C	26L6.0-ZOO-801	Structure and Function of Vertebrates	4	4	0	4	0	0	4	30	-	70	-	100	3	-
CC-H5	Scheme B & C	26L6.0-ZOO-802	Comparative Physiology	4	4	0	4	0	0	4	30	-	70	-	100	3	-
CC-H6	Scheme B & C	26L6.0-ZOO-803	Population Genetics & Evolution	4	4	0	4	0	0	4	30	-	70	-	100	3	-
DSE-7	Scheme B & C	26L6.0-ZOO-804	Population and Community Ecology	4	4	0	4	0	0	4	30	-	70	-	100	3	-
		Or															
		26L6.0-ZOO-805	Environment and Public Health	4	4	0	4	0	0	4	30	-	70	-	100	3	-
PC-H2	Scheme B & C	26L6.0-ZOO-806	Practical Based on B26-ZOO-801 to B26-ZOO-803 and any one out of B26-ZOO-804 & 805	4	0	4	0	0	8	8	-	30	-	70	100	-	3
CC-HM2	B & C	From Available Core Courses in Minor Subject of 4 credits as per NEP															

Semester-8 (Honours with Research)

Course Type	Applicable Scheme	Course Code	Nomenclature of the Course	Credits			Contact hours L: Lecture P: Practical T: Tutorial				Internal Assessment Marks		End term Examination Marks		Total Marks	Examination hours	
				Total	Theory (Th)	Practical (P)	L	T	P	Total	Th	P	Th	P		Th	P
CC-H4	Scheme B & C	26L6.0-ZOO-801	Structure and Function of Vertebrates	4	4	0	4	0	0	4	30	-	70	-	100	3	-
CC-H5	Scheme B & C	26L6.0-ZOO-802	Comparative Physiology	4	4	0	4	0	0	4	30	-	70	-	100	3	-
Research	Scheme B & C	26L6.0-ZOO-807	Project/Dissertation	12			-					300		300			
CC-HM2	B & C		From Available Core Courses in Minor Subject of 4 credits as per NEP														

Scheme of MDC, VAC, SEC, AEC and VOC courses
offered in the University Pool
by the
Department of Zoology

Department of Zoology			Scheme of MDC, VAC, SEC and VOC courses										Scheme (UG) w.e.f. 2026-27					
Semester	Course Type	Applicable Scheme	Course Code	Nomenclature of the Course	Credits			Contact hours L: Lecture T: Tutorial P: Practical				Internal Assessment Marks		End term Examination Marks		Total Marks	Exam . Hours	
					Total	Theory (T)	Practical (P)	L	T	P	Total	T	P	T	P		T	P
1	MDC-1	Scheme A, B, C & D	26L4.5 MDC ZOO-101	Basics of Zoology-I	3	2	1	2	0	2	4	15	5	35	20	75	2	2
2	MDC-2	Scheme A, B, C & D	26L4.5 MDC ZOO-201	Basics of Zoology-II	3	2	1	2	0	2	4	15	5	35	20	75	2	2
3	MDC-3	Scheme A, B, C & D	26L4.5 MDC ZOO-301	Basics of Zoology-III	3	2	1	2	0	2	4	15	5	35	20	75	2	2
3	VAC-3	Scheme C only	26L5.0 VAC ZOO- 301	Indian Biodiversity	2	2	0	2	0	0	2	15	-	35	-	50	2	-
4	VAC-3	Scheme A, B & D	26L5.0 VAC ZOO- 301	Indian Biodiversity	2	2	0	2	0	0	2	15	-	35	-	50	2	-
4	VAC-4	Scheme C only	26L5.0 VAC ZOO- 401	Ecology and Environment	2	2	0	2	0	0	2	15	-	35	-	50	2	-
2	SEC-2	Scheme A, B, C & D	26L4.5 SEC- ZOO-201	Taxidermy	3	2	1	2	0	2	4	15	5	35	20	75	2	2
			26L4.5 SEC- ZOO-202	Techniques in Bird Watching														
			26L4.5 SEC- ZOO-203	Camera Trapping in Wildlife Studies														

3	SEC-3	Scheme A, B, C & D	26L5.0 SEC-ZOO-301	Microtomy	3	2	1	2	0	2	4	15	5	35	20	75	2	2
3	VOC-1	Scheme B only	26L5.0 VOC- ZOO-301	Apiculture	4	2	2	2	0	4	6	15	15	35	35	100	2	2
4	VOC-1	Scheme A, C & D	26L5.0 VOC- ZOO-401	Vermicomposting	4	2	2	2	0	4	6	15	15	35	35	100	2	2
	VOC-2	Scheme B																
5	VOC-2	Scheme A/C/D	26L5.5 VOC- ZOO-501	Apiculture	4	2	2	2	0	4	6	15	15	35	35	100	2	2
6	VOC-3	Scheme A/B/C/D	26L5.5 VOC- ZOO-601	Poultry Farming	4	2	2	2	0	4	6	15	15	35	35	100	2	2
			26L5.5 VOC- ZOO-602	Fish Farming	4	2	2	2	0	4	6	15	15	35	35	100	2	2

Semester-I

Part A – Introduction			
Name of Subject	Zoology		
Semester	I		
Nature of Course/Course Composition	Theory + Practical		
Nomenclature of the Course	Diversity of Non-Chordates		
Course Code	26L4.5-ZOO-101		
Course Type	CC-1 MCC-1 (4 credit)		
Course Level	100-199		
Pre-requisite for the course (if any)	Biology as a Subject at 4.0 Level (Class XII)		
Course Learning Outcomes (CLOs) After completing this course, the learner will be able to:	CLO ₁	Describe characters, classification, and type studies of Protozoa, Porifera, and Coelenterata.	
	CLO ₂	Explain characters, classification, and detailed organization of Platyhelminthes, Aschelminthes, Annelida, and Arthropoda.	
	CLO ₃	Interpret characters, classification, and type studies of Mollusca, Echinodermata, and Hemichordata.	
	CLO ₄	Identify, classify, and study ecological and economic importance of non-chordates through specimens and slides.	
	Theory	Practical	Total
Credits	3	1	4
Teaching hours per week	3	2	5
Internal Assessment Marks	25	05	30
End Term Exam Marks	50	20	70
Max. Marks	75	25	100
Examination Duration (in Hours)	3	2	
Part B- Contents of the Course			
<u>Instructions for Theory Paper-Setter</u>			
The paper setter shall prepare 7 questions selecting two questions from each of the three units with consideration given to the Course Learning Outcomes. Among these, question number 1 will be compulsory question comprising 4 short answer type questions carrying two marks each (total 08 marks) and covering the entire syllabus. The remaining questions will be carrying 14 marks each. Examinees will be required to attempt four questions: the compulsory question no. 1 and 1 question from the each of the three units.			
<u>Instructions for Practical Examiner</u>			
Write-up and execution of the practical will be conducted as per the nature of the practical by the external examiner, with consideration given to the Course Learning Outcomes.			
	Topics	CLO/s Attempt	Contact Hours
Unit-I	Phylum Protozoa: General characters and classification up to class level, Life cycle of Parasitic protozoans Phylum Porifera: General characters and classification up to class level, Canal system in sponges, Spicules in	1	14

	sponges Phylum–Coelentrata: General characters and classification up to class level, Corals reef and Polymorphism		
Unit-II	Phylum – Platyhelminthes and Aschelminthes: General characters and classification up to class level, Common roundworms and their economic importance Parasitic Helminthes Phylum –Annelida: General characters and classification up to class level, Metamerism in Annelida Larval forms in Annelids Phylum – Arthropoda: General characters and classification up to class level, Type study of Grasshopper, (Habitat, habits, external morphology, digestive system, respiratory system, excretory system, reproductive system)	2	17
Unit-III	Phylum - Mollusca: General characters and classification up to class level, Torsion and detorsion in gastropoda Phylum – Echinodermata: General characters and classification up to class level, Larval forms of Echinoderm, Aristotle’s Lantern: Structure & Functions Phylum Hemichordata: General characters of Hemichordates with examples	3	14
Practical	Classification up to orders with ecological note and economic importance of the following animals: 1. Protozoa: Lamination of cultures of Amoeba, Euglena and Paramecium; permanent prepared slides: Amoeba, Euglena, Trypanosoma, Noctiluca,, Paramecium (binary fission and conjugation), Opalina, Vorticella, Balantidium, radiolarian and formaniferan ooze. 2. Parazoa (Porifera): Sycon, Grantia, Euplectella, Hyalonema, Spongilla, Euspongia 3. Coelenterata: Porpita, Valella, Physalia, Aurelia, Rhizostoma, Metridium, Millipora, Alcyonium, Tubipora, Zoanthus, Madrepora, Favia, Fungia, and Astrea. Permanent prepared slides: Hydra (W.M.), Hydra with buds, Obelia (colony and medusa), Sertularia, Plumularia, Tubularia, cestum Bougainvillea, Aurelia (sense organs and stages of life history). 4. Playhelminthes: Dugesia, Fasciola, Taenia, Echinocoecus. Permanent prepared slides: Miracidium, Sporocyst, Redia, Cercaria, Scolex and Proglottids of Taenia (mature and gravid). 5. Aschelminthes: Ascaris (male and female),	4	30

	Meloidogyne marioni 6. Annelida: Pheretima, Heteronereis, Polynoe, Aphrodite, Chaetopterus, Arenicola, Tubifex and Pontobdella, Eunice, Terebella 7. Arthropoda: Peripatus, Palaemon (Prawn), Lobster, Cancer (crab), Sacculina, Eupagurus (hermit crab), Lepas, Balanus, Cyclops, Daphnia, Lepisma, Periplaneta (cockroach), Schistocerca (locust), Poecilocus (grasshopper), Gryllus (cricket), Mantis (praying mantis), Cicada, Forficula (earwig), Dragon fly, termite queen, bug, moth, beetle, Polistes (wasp), Apis (honey bee), Bombyx (silk moth), Cimex (beg bug), Pediculus (body louse), Millipede, Scolopendra (centipede), Palamnaeus (scorpion), Aranea (spider), Limulus (king crab) 8. Mollusca: Mytilus, Ostrea, Cardium, Pholas, Solen (razor/Fish), Pecten, Haliotis, Patella, Aplysia, Doris, Limax, Loligo, Sepia, Pila, Octopus, Unio Nautilus (complete and T.S.), Chiton and Dentalium 9. Echinodermata: Asterias, Echinus, Cucumaia, Ophiothrix, Antedon and Asterothyton 10. Hemichordata: Balanoglossus 11. Study of slides of Non-Chordates phyla; Staining of Obelia and Sertularia				
	Contact Hours	75			
Evaluation Methods					
Internal Assessment	TH-25	PR-05	End Term Examination: 70	TH-50	PR-20
Class Participation:	5	0	Lab record	NA	05
Seminar/presentation/assignment/quiz/class test etc.:	5	NA	Viva-Voce	NA	05
Seminar/Demonstration/Viva-voce/Lab records etc.:	NA	05	Written Examination	50	NA
Mid-Term Exam:	15	NA	Write-up and execution of the practical	NA	10
Part C-Learning Resources					
Recommended Books/Journals/ e-resources/ Learning Management Systems (LMS):					
1. Jordan, E. L., and Verma, P. S. (2025). Invertebrate zoology (14th rev. ed.). S. Chand Publishing, New Delhi. 2. Kotpal, R. L. (2021). Modern textbook of zoology: Invertebrates (12th ed.). Rastogi Publications, Meerut. 3. Lal, S. S. (2023). <i>Practical zoology: Invertebrates</i> (12th ed.). Rastogi Publications, Meerut. 4. Brusca, R. C., Giribet, G., and Moore, W. (2022). Invertebrates (4th ed.). Oxford University Press 5. Schierwater, B. and Desalle, R. (2021). <i>Invertebrate zoology: A tree of life approach</i> . CRC Press 6. Barnes, R. D., Ruppert, E. E., & Fox, R. S. (2007). <i>Invertebrate zoology</i> (7th ed.). Cengage Learning. 7. Nair, N. C., Arumugam, N., Soundarapandian, N., Murugan, T., and Leelavathy, S. (2010). A textbook of invertebrates. Saras Publication, Nagercoil.					

E-resources

1. https://mlsu.ac.in/econtents/4190_practical-zoology-invertebrate.pdf
2. <https://www.egyankosh.ac.in/bitstream/123456789/69616/2/Block-4.pdf>
3. <https://uou.ac.in/sites/default/files/slm/MSZO-501.pdf>
4. https://dspace.sxcjpr.edu.in/jspui/bitstream/123456789/718/1/2001_Barnes_et_al_%28%28The%20I%20nvertebrates_%20A%20Synthesis%29.pdf
5. <https://assets.vmou.ac.in/MZO01.pdf>

Mapping of Course Learning Outcomes (CLOs) to Program Learning Outcomes (PLOs)

CLOs	PLO ₁	PLO ₂	PLO ₃	PLO ₄	PLO ₅	PLO ₆	PLO ₇	PLO ₈	PLO ₉	PLO ₁₀	PLO ₁₁
CLO ₁	3	2	-	-	1	-	1	2	2	-	2
CLO ₂	3	2	-	-	1	-	2	2	2	-	2
CLO ₃	3	2	-	-	1	-	2	2	3	-	2
CLO ₄	2	2	1	2	1	2	3	2	3	3	3

Content Mapping with NEP thrust areas

Field	Hours devoted
Employability	32
Entrepreneurship	4
Skill Enhancement	30
Communication Development	-
Indian Knowledge System	-
Environmental Awareness/SDGs	8
Current Issues and Social Awareness	6
Gender issues	-
Public policies	-
Any Other	-

Part A – Introduction			
Name of Subject	Zoology		
Semester	I		
Nature of Course/Course Composition	Theory + Practical		
Nomenclature of the Course	Type study of Non-chordates		
Course Code	26L4.5-ZOO-102		
Course Type	MCC-2 (4 credit)		
Course Level	100-199		
Pre-requisite for the course (if any)	Biology as a Subject at 4.0 Level (Class XII)		
Course Learning Outcomes (CLOs) After completing this course, the learner will be able to:	CLO ₁	Explain biodiversity, economic importance, and structural features of Protozoa, Porifera, and Coelenterata.	
	CLO ₂	Describe biodiversity, economic importance, and key concepts of Platyhelminthes, Aschelminthes, Annelida, and Arthropoda.	
	CLO ₃	Interpret biodiversity, economic importance, and specialized features of Mollusca, Echinodermata, and Hemichordata.	
	CLO ₄	Perform identification, slide preparation, and anatomical study of non-chordates using specimens and models.	
	Theory	Practical	Total
Credits	3	1	4
Teaching hours per week	3	2	5
Internal Assessment Marks	25	05	30
End Term Exam Marks	50	20	70
Max. Marks	75	25	100
Examination Duration (in Hours)	3	2	
Part B- Contents of the Course			
<u>Instructions for Theory Paper-Setter</u>			
The paper setter shall prepare 7 questions selecting two questions from each of the three units with consideration given to the Course Learning Outcomes. Among these, question number 1 will be compulsory question comprising 4 short answer type questions carrying two marks each (total 08 marks) and covering the entire syllabus. The remaining questions will be carrying 14 marks each. Examinees will be required to attempt four questions: the compulsory question no. 1 and 1 question from the each of the three units.			
<u>Instructions for Practical Examiner</u>			
Write-up and execution of the practical will be conducted as per the nature of the practical by the external examiner, with consideration given to the Course Learning Outcomes.			
	Topics	CLO/s Attempt	Contact Hours
Unit-I	Phylum Protozoa: Biodiversity and economic importance of Protozoans; Type study of Plasmodium Phylum Porifera: Biodiversity and economic importance	1	15

	of poriferans, Type study of Sycon Phylum – Coelentrata: Biodiversity and economic importance of cnidarians, Type Study of Obelia		
Unit-II	Phylum – Platyhelminthes and Aschelminthes: Biodiversity and economic importance of flat worms, Type study of Fasciola hepatica and Ascaris lumbricoides, Phylum – Annelida: Biodiversity and economic importance of annelids Type study of Earthworm, Pheretima posthuma (Habitat, habits, metamerism, digestive System, circulatory system, nervous system, reproductive system) Phylum – Arthropoda: Biodiversity and economic importance of insects (insect vectors, lac insects, honey bee, insect pest) & crustaceans Type study of Cockroach	2	17
Unit-III	Phylum - Mollusca: Biodiversity and economic importance of Molluscs Type study of Pila Phylum – Echinodermata: Biodiversity and economic importance of echinoderms, Type study of Asterias (Sea Star) (Habitat, habits, external morphology, water vascular system, Circulatory System) Phylum – Hemichordata: Type Study of Balanoglossus	3	13
Practical	Study of the following permanent stained preparations: 1. L.S. and T.S. Sycon; gemmules, spicules and spongin fibres of Sycon, canal system of sponges 2. T.S. Hydra (testis and ovary region) 3. T.S. Fasciola (different regions) 4. T.S. Ascaris (male and female), W.M. of Trichinella, Ancylostoma, 5. T.S. Pheretima (pharyngeal and typhlosolar regions), Setae, septal nephridia and spermathecae of Pheretima. 6. Trachea and mouthparts of cockroach. 7. Statocyst of Palaemon, W.M. Daphnia, Cyclops, Cimex, Pediculus 8. Glochidium larva of Anodonta; radula and osphradium of Pila. 9. T.S. Star fish (arm). 10. T.S. Balanoglossus (through various regions). Preparation of the following slides: 1. Temporary preparation of Volvox, Paramecium, Gemmules and spicules of Sycon; mouth parts and trachea of Periplaneta (cockroach).	4	30

	2. Preparation of permanent stained whole mounts of Hydra, Obelia, Sertularia, Plumularia and Bougainvillea. 3. Preparation of mouth parts of Mosquito, House fly and cockroach. Study of Internal Anatomy 1. Computer, simulated study/ model of: (i) Earthworm: Digestive, reproductive and nervous systems (ii) Pila : Pallial complex, digestive and nervous system 2. Demonstration of internal anatomy of cockroach: Digestive, reproductive and nervous systems				
	Contact Hours			75	
Evaluation Methods					
Internal Assessment	TH-25	PR-5	End Term Examination: 70	TH-50	PR-20
Class Participation:	5	0	Lab record	NA	05
Seminar/presentation/assignment/quiz/class test etc.:	5	NA	Viva-Voce	NA	05
Seminar/Demonstration/Viva-voce/Lab records etc.:	NA	5	Written Examination	50	NA
Mid-Term Exam:	15	NA	Write-up and execution of the practical	NA	10
Part C-Learning Resources					
Recommended Books/Journals/ e-resources/ Learning Management Systems (LMS): 1. Jordan, E. L., and Verma, P. S. (2025). Invertebrate zoology (14th rev. ed.). S. Chand Publishing, New Delhi. 2. Kotpal, R. L. (2021). Modern textbook of zoology: Invertebrates (12th ed.). Rastogi Publications, Meerut. 3. Lal, S. S. (2023). <i>Practical zoology: Invertebrates</i> (12th ed.). Rastogi Publications, Meerut. 4. Brusca, R. C., Giribet, G., and Moore, W. (2022). Invertebrates (4th ed.). Oxford University Press 5. Schierwater, B. and Desalle, R. (2021). <i>Invertebrate zoology: A tree of life approach</i> . CRC Press 6. Barnes, R. D., Ruppert, E. E., & Fox, R. S. (2007). <i>Invertebrate zoology</i> (7th ed.). Cengage Learning. 7. Nair, N. C., Arumugam, N., Soundarapandian, N., Murugan, T., and Leelavathy, S. (2010). A textbook of invertebrates. Saras Publication, Nagercoil.					
E-resources 1. https://mlsu.ac.in/econtents/4190_practical-zoology-invertebrate.pdf 2. https://www.egyankosh.ac.in/bitstream/123456789/69616/2/Block-4.pdf 3. https://uou.ac.in/sites/default/files/slm/MSCZO-501.pdf 4. https://dspace.sxcjpr.edu.in/jspui/bitstream/123456789/718/1/2001_Barnes_et_al_%28%28The%20Invertebrates%20A%20Synthesis%29.pdf 5. https://assets.vmou.ac.in/MZO01.pdf					

Mapping of Course Learning Outcomes (CLOs) to Program Learning Outcomes (PLOs)

CLOs	PLO ₁	PLO ₂	PLO ₃	PLO ₄	PLO ₅	PLO ₆	PLO ₇	PLO ₈	PLO ₉	PLO ₁₀	PLO ₁₁
CLO ₁	3	2	-	2	1	-	1	2	2	-	2
CLO ₂	3	2	-	2	1	-	2	2	2	-	2
CLO ₃	3	2	-	2	1	-	2	3	2	-	3
CLO ₄	2	2	1	-	1	2	3	3	3	3	3

Content Mapping with NEP thrust areas

Field	Hours devoted
Employability	30
Entrepreneurship	5
Skill Enhancement	30
Communication Development	-
Indian Knowledge System	-
Environmental Awareness/SDGs	10
Current Issues and Social Awareness	7
Gender issues	-
Public policies	-
Any Other	-

Part A – Introduction			
Name of Subject	Zoology		
Semester	I		
Nature of Course/Course Composition	Theory + Practical		
Name of the Course	Introduction of Non-Chordates		
Course Code	26L4.5-ZOO-103		
Course Type	CC-M1 (2 credit)		
Course Level	100-199		
Pre-requisite for the course (if any)	Biology as a Subject at 4.0 Level (Class XII)		
Course Learning Outcomes (CLOs) After completing this course, the learner will be able to:	CLO ₁	Describe general characters and classification of major non-chordate phyla.	
	CLO ₂	Explain ecological and economic importance of different non-chordate groups.	
	CLO ₃	Identify and classify non-chordates with their ecological and economic significance using specimens and slides.	
	Theory	Practical	Total
Credits	1	1	2
Teaching hours per week	1	2	3
Internal Assessment Marks	05	05	10
End Term Exam Marks	20	20	40
Max. Marks	25	25	50
Examination Duration (in Hours)	02	02	
Part B- Contents of the Course			
<u>Instructions for Theory Paper-Setter</u>			
The paper setter shall prepare 4 questions from unit 01 with consideration given to the Course Learning Outcomes. Among these, question number 1 will be compulsory question comprising 6 short answer type questions carrying one mark each (total 06 marks). The remaining questions will be carrying 07 marks each. Examinees will be required to attempt three questions: the compulsory question no. 1 and 02 questions from other 03 questions.			
<u>Instructions for Practical Examiner</u>			
Write-up and execution of the practical will be conducted as per the nature of the practical by the external examiner, with consideration given to the Course Learning Outcomes.			
Topics		CLO/s Attempt	Contact Hours
Unit-I	Phylum Protozoa: General characters and classification of Protozoa with their ecological and economic importance Phylum Porifera: General characters and classification of Porifera with their ecological and economic importance Phylum – Coelentrata: General characters and classification of Coelentrata with their ecological and economic importance	1,2	15

	Phylum – Platyhelminthes and Aschelminthes: General characters and classification of Helminthes with their ecological and economic importance Phylum – Annelida: General characters and classification of Annelida with their ecological and economic importance Phylum – Arthropoda: General characters and classification of Arthropods with their ecological and economic importance Phylum - Mollusca: General characters and classification of Mollusca with their ecological and economic importance Phylum – Echinodermata: General characters and classification of Echinoderms with their ecological and economic importance Phylum Hemichordata: General Characters of Hemichordates with examples		
Practical	Classification up to orders with ecological note and economic importance of the following animals: 1. Protozoa: Permanent slides: Amoeba, Euglena, Trypanosoma, Noctiluca, Eimeria, Paramecium (binary fission and conjugation), Opalina, Vorticella, Balantidium, Nyctotherus, radiolarian and foramaniferan ooze. 2. Porifera: Sycon, Grantia, Euplectella, Hyalonema, Spongilla, Euspongia 3. Coelenterata: Porpita, Valella, Physalia, Aurelia, Rhizostoma, Metridium, Millipora, Alcyonium, Tubipora, Zoanthus, Madrepora, Favia, Fungia, and Astrea. Permanent slides of Hydra (W.M.), Hydra with buds, Obelia (colony and medusa), Sertularia, Plumularia, Tubularia, Bougainvillea, Aurelia. 4. Playhelminthes: Dugesia, Fasciola, Taenia, Echinocoecus. Permanent prepared slides: Miracidium, Sporocyst, Redia, Cercaria, Scolex and Proglottids of Taenia (mature and gravid). Aschelminthes: Ascaris (male and female), Trichinella, Ancylostoma, Meloidogyne 5. Annelida: Pheretima, Heteronereis, Polynoe, Aphrodite, Chaetopterus, Arenicola, Tubifex and Pontobdella 6. Arthropoda: Peripatus, Palaemon (Prawn), Lobster, Cancer (Crab), Sacculina, Eupagurus (Hermit crab), Lepas, Balanus, Cyclops, Daphnia,	2	30

	Lepisma, Periplaneta (cockroach), Schistocerca (Locust), Poecilocus (ak- hopper), Gryllus (cricket), Mantis (praying mantis), Cicada, Forticula (earwig), Dragon fly, termite queen, bug, moth, beetle, Polistes (wasp), Apis (Honey bee), Bombyx (Silk moth), Cimex (Bed bug), Pediculus (Head louse), Millipede, Scolopendra (centipede), Palamnaeus (scorpion), Aranea (spider), Limulus (king crab) 7. Mollusca: Mytilus, Ostrea, Cardium, Pholas, Solen (razor / Fish), Pecten, Holiotis, Patella, Aplysia, Doris, Limax, Loligo, Sepia, Octopus, Nautilus (complete and T.S.), Chiton and Dentalium 8. Echinodermata: Asterias, Echinus, Cucumaia, Ophiothrix, Antedon and Asterophyton 9. Hemichordata: Balanoglossus				
Suggested Evaluation Methods					
Internal Assessment	TH-05	PR-05	End Term Examination: 40	TH-20	PR-20
Class Participation	5	0	Lab record	NA	5
Seminar/presentation/assignment/quiz/class test etc.	0	NA	Viva-Voce	NA	5
Seminar/Demonstration /Viva-voce/Lab records etc.	NA	5	Written Examination	20	NA
Mid-Term Exam	NA	NA	Write-up and execution of the practical	NA	10
Part C-Learning Resources					
Recommended Books/Journals/ e-resources/ Learning Management Systems (LMS):					
1. Jordan, E. L., and Verma, P. S. (2025). Invertebrate zoology (14th rev. ed.). S. Chand Publishing, New Delhi. 2. Kotpal, R. L. (2021). Modern textbook of zoology: Invertebrates (12th ed.). Rastogi Publications, Meerut. 3. Lal, S. S. (2023). <i>Practical zoology: Invertebrates</i> (12th ed.). Rastogi Publications, Meerut. 4. Brusca, R. C., Giribet, G., and Moore, W. (2022). Invertebrates (4th ed.). Oxford University Press 5. Schierwater, B. and Desalle, R. (2021). <i>Invertebrate zoology: A tree of life approach</i> . CRC Press 6. Barnes, R. D., Ruppert, E. E., & Fox, R. S. (2007). <i>Invertebrate zoology</i> (7th ed.). Cengage Learning. 7. Nair, N. C., Arumugam, N., Soundarapandian, N., Murugan, T., and Leelavathy, S. (2010). A textbook of invertebrates. Saras Publication, Nagercoil.					
E-resources					
1. https://mlsu.ac.in/econtents/4190_practical-zoology-invertebrate.pdf 2. https://www.egyankosh.ac.in/bitstream/123456789/69616/2/Block-4.pdf 3. https://uou.ac.in/sites/default/files/slm/MSCZO-501.pdf 4. https://dspace.sxcjpr.edu.in/jspui/bitstream/123456789/718/1/2001_Barnes_et_al_%28%28The%20Invertebrates%20A%20Synthesis%29.pdf 5. https://assets.vmu.ac.in/MZO01.pdf					

Mapping of Course Learning Outcomes (CLOs) to Program Learning Outcomes (PLOs)

CLOs	PLO ₁	PLO ₂	PLO ₃	PLO ₄	PLO ₅	PLO ₆	PLO ₇	PLO ₈	PLO ₉	PLO ₁₀	PLO ₁₁
CLO ₁	3	2	-	-	1	-	1	2	2	-	2
CLO ₂	2	2	-	3	1	-	2	2	2	-	3
CLO ₃	3	2	1	2	1	2	3	3	3	3	3

Content Mapping with NEP thrust areas

Field	Hours devoted
Employability	20
Entrepreneurship	3
Skill Enhancement	30
Communication Development	-
Indian Knowledge System	-
Environmental Awareness/SDGs	10
Current Issues and Social Awareness	5
Gender issues	-
Public policies	-
Any Other	-

Semester-II

Part A – Introduction			
Name of Subject	Zoology		
Semester	II		
Nature of Course/Course Composition	Theory + Practical		
Nomenclature of the Course	Diversity of Chordates		
Course Code	26L4.5-ZOO-201		
Course Type	CC-2 MCC-3		
Course Level	100-199		
Pre-requisite for the course (if any)	Biology as a Subject at 4.0 Level (Class XII)		
Course Learning Outcomes (CLOs) After completing this course, the learner will be able to:	CLO ₁	Describe the salient features, classification, morphology, and affinities of chordates and protochordates, with special reference to the type study of <i>Herdmania</i> .	
	CLO ₂	Explain the classification, biodiversity, adaptations, and type studies of fishes and amphibians, including scales, fins, parental care, and neoteny.	
	CLO ₃	Interpret the classification, distinguishing characters, and evolutionary adaptations of reptiles, birds, and mammals, including the type study of rat.	
	CLO ₄	Identify and classify chordate specimens, skeletons, histological slides, and permanent preparations through laboratory work and field visits.	
	Theory	Practical	Total
Credits	3	1	4
Teaching hours per week	3	2	5
Internal Assessment Marks	25	05	30
End Term Exam Marks	50	20	70
Max. Marks	75	25	100
Examination Duration (in Hours)	3	2	
Part B- Contents of the Course			
<u>Instructions for Theory Paper-Setter</u>			
The paper setter shall prepare 7 questions selecting two questions from each of the three units with consideration given to the Course Learning Outcomes. Among these, question number 1 will be compulsory question comprising 4 short answer type questions carrying two marks each (total 08 marks) and covering the entire syllabus. The remaining questions will be carrying 14 marks each. Examinees will be required to attempt four questions: the compulsory question no. 1 and 1 question from the each of the three units.			
<u>Instructions for Practical Examiner</u>			
Write-up and execution of the practical will be conducted as per the nature of the practical by the external examiner, with consideration given to the Course Learning Outcomes.			
	Topics	CLO/s	Contact Attemp Hours

		t			
Unit-I	Chordates: Salient features of chordates; Principles of classification; Protochordates: Urochordata: Systematic position, distribution, ecology, morphology and affinities Urochordata: Type Study of Herdmania	1	14		
Unit-II	Pisces: General characters and classification up to classes with examples emphasizing their biodiversity, Scales & Fins, Type study of <i>Labeo</i> Amphibia: General characters and Classification upto class level; Type study of frog, Parental Care and Neoteny in Amphibia	2	17		
Unit-III	Reptilia: General characters and Classification upto classes, Aves: General characters and Classifications upto classes. Flight/Aerial adaptation in birds, Archaeopteryx as missing link Mammals: General characters and classification up to classes; Type study of Rat	3	14		
Practical	1. Classification upto orders, habit, habitats, external characters and economic importance (if any): Protochordata: <i>Molgula</i> , <i>Hetryllus</i> , <i>Pyrosoma</i> , <i>Doliolum</i> , <i>Olikopleura</i> , and <i>Amphioxus</i> . Cyclostomata: <i>Myxine</i> , <i>Petromyzon</i> and <i>Ammocoetus larva</i> . Chondrichthyes: <i>Zygaena</i> , <i>Pristis</i> , <i>Narcine</i> (electric ray), <i>Trygon</i> , <i>Rhinobatus</i> , <i>Raja</i> and <i>Chimaera</i> . Osteichthyes: <i>Acipenser</i> , <i>Lepidosteus</i> , <i>Muraena</i> , <i>Mystus</i> , <i>Catla</i> , <i>Hippocampus</i> , <i>Syngnathus</i> , <i>Exocoetus</i> , <i>Anabas</i> , <i>Diodon</i> , <i>Ostracion</i> , <i>Tetradon</i> , <i>Echinus</i> , <i>Lophius</i> , <i>Solea</i> and <i>Polypterus</i> . Any of the Lung Fishes. Amphibia: <i>Necturus</i> , <i>Proteus</i> , <i>Amphiuma</i> , <i>Salamandra</i> , <i>Ambystoma</i> , <i>Axolotl larva</i> , <i>Alytes</i> , <i>Bufo</i> , <i>Rana</i> . Reptilia: <i>Hemidactylus</i> , <i>Calotes</i> , <i>Draco</i> , <i>Varanus</i> , <i>Phrynosoma</i> , <i>Chamaeleon</i> , <i>Typhlops</i> , <i>Python</i> , <i>Eryx</i> , <i>Ptyas</i> , <i>Bungarus</i> , <i>Naja</i> , <i>Hydrus</i> , <i>Viper</i> , <i>Crocodilus</i> , <i>Gavialis</i> , <i>Chelone</i> (Turtle) and <i>Testudo</i> (Tortoise). Aves: <i>Casuarus</i> , <i>Arden</i> , <i>Anas</i> , <i>Milvus</i> , <i>Pavo</i> , <i>Eudynamis</i> , <i>Tyto</i> , <i>Alcedo</i> , <i>Halcyon</i> Mammalia: <i>Ornithorhynchus</i> , <i>Echidna</i> , <i>Didelphis</i> , <i>Macropus</i> , <i>Loris</i> , <i>Macaque</i> , <i>Hystrix</i> , <i>Funambulus</i> , <i>Felix</i> , <i>Panthera</i> , <i>Canis</i> , <i>Herpestes</i> , <i>Capra</i> , <i>Pteropus</i> . Study of the skeleton of <i>Scoliodon</i> , <i>Labeo</i> , <i>Rana</i> (Frog), <i>Varanus</i> , Pigeon or <i>Gallus</i> and <i>Orcyctolagus</i> /rat. Study of the following permanent slides: Tornaria larva, T.S. <i>Amphioxus</i> (through different regions). <i>Oikopleura</i> , Histology of rat (compound tissues), different types of scales. Make permanent stained preparations of the following: <i>Salpa</i> , Spicules, and Pharynx of <i>Herdmania</i> , <i>Amphioxus</i> , Cycloid scales Field Visit to Protected areas/National Park/Wildlife Sanctuary or Zoo.	4	30		
	Contact Hours		75		
Evaluation Methods					
Internal Assessment	TH-25	PR-5	End Term Examination: 70	TH-50	PR-20
Class Participation:	5	0	Lab record	NA	05
Seminar/presentation/assignment/quiz/class test etc.:	5	NA	Viva-Voce	NA	05
Seminar/Demonstration/Viva-	NA	5	Written Examination	50	NA

voice/Lab records etc.:					
Mid-Term Exam:	15	NA	Write-up and execution of the practical	NA	10
Part C-Learning Resources					
Recommended Books/Journals/ e-resources/ Learning Management Systems (LMS):					
1. Kotpal, R. L. (2010). <i>Modern textbook of zoology: Vertebrates</i>. Rastogi Publications. 2. Jordan, E. L., & Verma, P. S. (2014). <i>Chordate zoology</i> (15th ed.). S. Chand Publishing 3. Barrington, E. J. W. (1965). <i>The biology of Hemichordata and Protochordata</i>. Oliver & Boyd. 4. Walters, H. E., & Sayles, L. P. (1961). <i>Biology of vertebrates</i>. Macmillan. 5. Kent, G. C., & Carr, R. K. (2001). <i>Comparative anatomy of the vertebrates</i> (9th ed.). McGraw-Hill Higher Education. 6. Lal, S. S. (2019). <i>Practical zoology: Vertebrate</i>. Rastogi Publications.					
E-resources					
1. https://dpbck.ac.in/wp-content/uploads/2023/06/3.-Vertebrate-Kotpal_compressed.pdf 2. https://archive.org/details/in.ernet.dli.2015.279718/page/n769/mode/2up 3. https://www.mlsu.ac.in/econtents/758_PRACTICAL%20ZOOLOGY%20%20VERTEBRATE%20(%20PDFDrive%20).pdf 4. https://uou.ac.in/sites/default/files/slm/MSZO-601.pdf					

Mapping of Course Learning Outcomes (CLOs) to Program Learning Outcomes (PLOs)

CLOs	PLO ₁	PLO ₂	PLO ₃	PLO ₄	PLO ₅	PLO ₆	PLO ₇	PLO ₈	PLO ₉	PLO ₁₀	PLO ₁₁
CLO ₁	3	2	-	-	1	-	1	2	2	1	2
CLO ₂	3	2	-	2	1	-	2	2	2	1	2
CLO ₃	3	2	-	2	1	-	2	2	2	1	2
CLO ₄	2	2	1	2	1	2	3	3	3	3	3

Content Mapping with NEP thrust areas

Field	Hours devoted
Employability	22
Entrepreneurship	-
Skill Enhancement	30
Communication Development	-
Indian Knowledge System	-
Environmental Awareness/SDGs	12
Current Issues and Social Awareness	5
Gender issues	-
Public policies	-
Any Other	-

Part A – Introduction			
Name of Subject	Zoology		
Semester	II		
Nature of Course/Course Composition	Theory + Practical		
Nomenclature of the Course	Applied Zoology		
Course Code	26L4.5-ZOO-202		
Course Type	DSEC-1		
Course Level	100-199		
Pre-requisite for the course (if any)	Biology as a Subject at 4.0 Level (Class XII)		
Course Learning Outcomes (CLOs) After completing this course, the learner will be able to:	CLO ₁	Explain the principles and practices of apiculture and sericulture, including the biology, rearing, products, and economic importance of honey bees and silkworms.	
	CLO ₂	Describe the techniques and significance of prawn culture, pearl culture, and pisciculture, with emphasis on farming methods, products, and commercial applications.	
	CLO ₃	Discuss poultry, fur, leather, and piggery industries, including breeding, processing techniques, animal products, and their industrial and pharmaceutical uses.	
	CLO ₄	Identify economically important animals, culture practices, and aquaculture resources, and perform basic practical techniques and field-based observations related to animal husbandry and fisheries.	
	Theory	Practical	Total
Credits	3	1	4
Teaching hours per week	3	2	5
Internal Assessment Marks	25	05	30
End Term Exam Marks	50	20	70
Max. Marks	75	25	100
Examination Duration (in Hours)	3	2	
Part B- Contents of the Course			
<u>Instructions for Theory Paper-Setter</u>			
The paper setter shall prepare 7 questions selecting two questions from each of the three units with consideration given to the Course Learning Outcomes. Among these, question number 1 will be compulsory question comprising 4 short answer type questions carrying two marks each (total 08 marks) and covering the entire syllabus. The remaining questions will be carrying 14 marks each. Examinees will be required to attempt four questions: the compulsory question no. 1 and 1 question from the each of the three units.			
<u>Instructions for Practical Examiner</u>			
Write-up and execution of the practical will be conducted as per the nature of the practical by the external examiner, with consideration given to the Course Learning Outcomes.			
	Topics	CLO/s	Contact Attem Hours

		pt	
Unit-I	Apiculture: History and introduction; Honey bee and kinds; Social organization and colony nests; Lifecycle; Bee keeping, selection, methods, products; Honey composition, quality and importance Sericulture: Silkworm moth species and their life cycle; Rearing of silkworm, silk reeling, twisting and weaving; Silk composition, kind and uses; Diseases and pests of silkworm	1	12
Unit-II	Prawn Culture: Introduction to Prawns, species; Prawn farming methods, processing and preservation of prawns. Pearl Culture: Historical background, species; Pearl formation, composition, quality and commercial value, Artificial culturing, synthetic pearl types and their manufacturing, methods of harvesting. Pisciculture: Economically important fresh water and marine fishes; Fish culture, Fish farming technologies, Problems of seed collection from natural resources, Induced breeding methods, Products and by products from pisciculture	2	17
Unit-III	Poultry: Nomenclature and breeds of poultry birds; Egg structure and quality, nutritive values, factors affecting size and egg processing, Poultry products and by products Fur and leather industry: Fur producing animals; Fur farming, dressing, processing and dyeing, Fur industry in India; Animals of leather industry, processing of skin, flaying, curing salting and tanning. Piggery and other utilities of animals: Characteristics of swine and important breeds, Products and by products; Pharmaceuticals from animals; Uses of animals in vaccine production	3	16
Practical	1. Life cycle of Chicken, Poultry farming 2. Study the morphology and identification of different castes of the honey bee (queen, worker and drone) 3. Study the life cycle of the honey bee using charts/models/specimens. 4. Demonstration of beekeeping equipment and honey extraction methods. 5. Study the life cycle of the silkworm (<i>Bombyx mori</i>). 6. Identification of common diseases and pests of silkworm through specimens/charts.	4	30

	7. Identification of commercially important freshwater and marine prawns. 8. Identification of economically important freshwater and marine fishes. 9. Morphology of Carp, Cat fish and Perch. 10. Identification of major poultry breeds and external body parts. 11. Fishing Crafts and Gears 12. Preparation of permanent slides of phytoplankton and zooplanktons which constitute the food of commercial fishes, their identification and study of important characters. 13. Field visit to aviary/fish pond and fish market/sericulture unit/Prawn farm and preparation of field report.		
	Contact Hours		75
Evaluation Methods			
Internal Assessment	TH-25	PR-5	End Term Examination: 70 TH-50 PR-20
Class Participation:	5	0	Lab record NA 05
Seminar/presentation/assignment/quiz/class test etc.:	5	NA	Viva-Voce NA 05
Seminar/Demonstration/Viva-voce/Lab records etc.:	NA	5	Written Examination 50 NA
Mid-Term Exam:	15	NA	Write-up and execution of the practical NA 10
Part C-Learning Resources			
Recommended Books/Journals/ e-resources/ Learning Management Systems (LMS):			
Instructions			
1. Shukla, G. S., & Upadhyay, V. B. (2019). <i>Economic zoology</i> (5th ed., 6th reprint). Rastogi Publications. 2. Mishra, R. C. (2020). <i>Honey bees and their management</i> (3rd ed.). ICAR–Indian Council of Agricultural Research. 3. Pillay, T. V. R., & Kutty, M. N. (2005). <i>Aquaculture: Principles and practices</i> (2nd ed.). Blackwell Publishing 4. Pandey, G. N., & Shukla, G. S. (2021). <i>Fish and fisheries</i> (2nd ed.). Rastogi Publications. 5. Sastry, N. S. R., Thomas, C. K., & Singh, R. A. (2022). <i>Livestock production management</i> (5th ed.). Kalyani Publishers. 6. Lucas, J. S., & Southgate, P. C. (2019). <i>Aquaculture: Farming aquatic animals and plants</i> (3rd ed.). Wiley-Blackwell. 7. Ganga, G., & Chetty, J. S. (2022). <i>An introduction to sericulture</i> (3rd ed.). Oxford & IBH Publishing Co. Pvt. Ltd. 8. Bell, D. D., & Weaver, W. D. (Eds.). (2022). <i>Commercial chicken meat and egg production</i> (6th ed.). Springer.			
E-resources			
1. https://scispace.com/pdf/honeybees-and-their-management-in-india-584drlq4gg.pdf 2. https://www.unipu.hr/fileadmin/datoteke/Znanost_o_moru/Obavijesti/MARIKULTURA_Aquaculture_Principles_and_Practices_2nd_edition.pdf 3. https://bieap.apcfss.in/Uploads/Materials/II_SERICULTURE.pdf 4. https://www.csrtimys.res.in/sites/default/files/ebooks/silkworm-host-plant.pdf 5. https://www.bhumipublishing.com/wp-content/uploads/2025/09/Practical-Handbook-of-Poultry-Farming-B.-Sc.-II-SEC.pdf 6. https://dpkmr.edu.in/pdf/research/1701889015_Poultry_farming_A_complete_guide_for_beginners.pdf			

Mapping of Course Learning Outcomes (CLOs) to Program Learning Outcomes (PLOs)

CLOs	PLO ₁	PLO ₂	PLO ₃	PLO ₄	PLO ₅	PLO ₆	PLO ₇	PLO ₈	PLO ₉	PLO ₁₀	PLO ₁₁
CLO ₁	3	2	-	2	1	-	2	2	2	1	3
CLO ₂	3	2	-	2	1	-	2	3	2	1	3
CLO ₃	3	2	-	2	1	-	2	2	3	1	3
CLO ₄	2	2	1	2	1	2	3	3	3	3	3

Content Mapping with NEP thrust areas

Field	Hours devoted
Employability	35
Entrepreneurship	28
Skill Enhancement	30
Communication Development	3
Indian Knowledge System	-
Environmental Awareness/SDGs	10
Current Issues and Social Awareness	8
Gender issues	-
Public policies	-
Any Other	-

Part A – Introduction			
Name of Subject	Zoology		
Semester	II		
Nature of Course/Course Composition	Theory + Practical		
Name of the Course	Introduction of Chordates		
Course Code	26L4.5-ZOO-203		
Course Type	*CC-M2		
Course Level	100-199		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLOs) After completing this course, the learner will be able to:	CLO ₁	Explain the classification, evolutionary relationships, diagnostic characters, and adaptive features of chordates from protochordates to mammals.	
	CLO ₂	Analyze the morphology, biodiversity, ecological significance, and special adaptations of major chordate groups with suitable examples.	
	CLO ₃	Identify and classify chordate specimens, skeletons, slides, and permanent preparations through laboratory exercises and field visits.	
	Theory	Practical	Total
Credits	1	1	2
Teaching hours per week	1	2	3
Internal Assessment Marks	05	05	10
End Term Exam Marks	20	20	40
Max. Marks	25	25	50
Examination Duration (in Hours)	02	02	
Part B- Contents of the Course			
<u>Instructions for Theory Paper-Setter</u>			
The paper setter shall prepare 4 questions from unit 01 with consideration given to the Course Learning Outcomes. Among these, question number 1 will be compulsory question comprising 6 short answer type questions carrying one mark each (total 06 marks). The remaining questions will be carrying 07 marks each. Examinees will be required to attempt three questions: the compulsory question no. 1 and 02 questions from other 03 questions.			
<u>Instructions for Practical Examiner</u>			
Write-up and execution of the practical will be conducted as per the nature of the practical by the external examiner, with consideration given to the Course Learning Outcomes.			
Topics		CLO/s	Contact Hours
Unit-I	Chordates: Salient features of chordates; Principles of classification; Origin and evolutionary tree of chordates Protochordates: Urochordata & Cephalochordates: Systematic position, distribution, ecology, morphology and affinities Cyclostomata: General characters and classification upto class	1, 2	15

	level. Ecological significance of cyclostomes Pisces: General characters and classification up to classes with examples emphasizing their biodiversity, Scales & Fins, Amphibia: General Characters and Classification upto class level; Parental Care and Neoteny in Amphibia Reptilia: General Characters and Classification upto classes, Extinct reptiles; Poisonous apparatus in snakes Aves: General Characters and classifications upto class level. Flight/Aerial adaptation in birds, Archaeopteryx as missing link Mammals: General Characters and classification up to class; Adaptive radiations of mammals, dentition in mammals.				
Practical	1. Classification upto orders, habit, habitats, external characters and economic importance (if any): • Protochordata: <i>Molqula</i>, <i>Hetryllus</i>, <i>Pyrosoma</i>, <i>Doliolum</i>, <i>Olikopleura</i>, and <i>Amphioxus</i>. • Cyclostomata: <i>Myxine</i>, <i>Petromyzon</i> and <i>Ammocoetus</i> larva. • Chondrichthyes: <i>Zygaena</i>, <i>Pristis</i>, <i>Narcine</i> (electric ray), <i>Trygon</i>, <i>Rhinobatus</i>, <i>Raja</i> and <i>Chimaera</i>. • Osteichthyes: <i>Acipenser</i>, <i>Lepidosteus</i>, <i>Muraena</i>, <i>Mystus</i>, <i>Catla</i>, <i>Hippocampus</i>, <i>Syngnathus</i>, <i>Exocoetus</i>, <i>Anabas</i>, <i>Diodon</i>, <i>Ostracion</i>, <i>Tetradon</i>, <i>Echinus</i>, <i>Lophius</i>, <i>Solea</i> and <i>Polypterus</i>. Any of the Lung Fishes. • Amphibia: <i>Necturus</i>, <i>Proteus</i>, <i>Amphiuma</i>, <i>Salamandra</i>, <i>Amblystoma</i>, <i>Axolotl</i> larva, <i>Alytes</i>, <i>Bufo</i>, <i>Rana</i>. • Reptilia: <i>Hemidactylus</i>, <i>Calotes</i>, <i>Draco</i>, <i>Varanus</i>, <i>Phrynosoma</i>, <i>Chamaeleon</i>, <i>Typhlops</i>, <i>Python</i>, <i>Eryx</i>, <i>Ptyas</i>, <i>Bungarus</i>, <i>Naja</i>, <i>Hydrus</i>, <i>Viper</i>, <i>Crocodilus</i>, <i>Gavialis</i>, <i>Chelone</i> (Turtle) and <i>Testudo</i> (Tortoise). • Aves: <i>Casuarus</i>, <i>Arden</i>, <i>Anas</i>, <i>Milvus</i>, <i>Pavo</i>, <i>Eudynamis</i>, <i>Tyto</i>, <i>Alcedo</i>, <i>Halcyon</i> • Mammalia: <i>Ornithorhynchus</i>, <i>Echidna</i>, <i>Didelphis</i>, <i>Macropus</i>, <i>Loris</i>, <i>Macaque</i>, <i>Hystrix</i>, <i>Funambulus</i>, <i>Felix</i>, <i>Panthera</i>, <i>Canis</i>, <i>Herpestes</i>, <i>Capra</i>, <i>Pteropus</i>. 2. Study of the skeleton of <i>Scoliodon</i>, <i>Labeo</i>, <i>Rana</i> (Frog), <i>Varanus</i>, Pigeon or <i>Gallus</i> and <i>Orcyctolagus</i>/rat, Palates of birds, skulls of dog & rabbit. 3. Study of the following prepared slides: Tornaria larva, T.S. <i>Amphioxus</i> (through different regions). <i>Oikopleura</i>, Histology of rat (compound tissues), different types of scales. 4. Make permanent stained preparations of the following: <i>Salpa</i>, Spicules, and Pharynx of <i>Herdmania</i>, <i>Amphioxus</i>, Cycloid scales 5. Field Visit to National Park or Zoo.	3	30		
Suggested Evaluation Methods					
Internal Assessment	TH-05	PR-05	End Term Examination: 40	TH-20	PR-20
Class Participation	5	0	Lab record	NA	5

Seminar/presentation/assignment/quiz/class test etc.	0	NA	Viva-Voce	NA	5
Seminar/Demonstration/Viva-voce/Lab records etc.	NA	5	Written Examination	20	NA
Mid-Term Exam	NA	NA	Write-up and execution of the practical	NA	10
Part C-Learning Resources					
Recommended Books/Journals/ e-resources/ Learning Management Systems (LMS): 1. Kotpal, R. L. (2010). <i>Modern textbook of zoology: Vertebrates</i>. Rastogi Publications. 2. Jordan, E. L., & Verma, P. S. (2014). <i>Chordate zoology</i> (15th ed.). S. Chand Publishing 3. Barrington, E. J. W. (1965). <i>The biology of Hemichordata and Protochordata</i>. Oliver & Boyd. 4. Walters, H. E., & Sayles, L. P. (1961). <i>Biology of vertebrates</i>. Macmillan. 5. Kent, G. C., & Carr, R. K. (2001). <i>Comparative anatomy of the vertebrates</i> (9th ed.). McGraw-Hill Higher Education. 6. Lal, S. S. (2019). <i>Practical zoology: Vertebrate</i>. Rastogi Publications. E-resources 1. https://dpbck.ac.in/wp-content/uploads/2023/06/3.-Vertebrate-Kotpal_compressed.pdf 2. https://archive.org/details/in.ernet.dli.2015.279718/page/n769/mode/2up 3. https://www.mlsu.ac.in/econtents/758_PRACTICAL%20ZOOLOGY%20%20VERTEBRATE%20(%20PDFDrive%20).pdf 4. https://uou.ac.in/sites/default/files/slm/MSCZO-601.pdf					

Mapping of Course Learning Outcomes (CLOs) to Program Learning Outcomes (PLOs)

CLOs	PLO ₁	PLO ₂	PLO ₃	PLO ₄	PLO ₅	PLO ₆	PLO ₇	PLO ₈	PLO ₉	PLO ₁₀	PLO ₁₁
CLO ₁	3	2	-	1	1	-	2	2	3	1	2
CLO ₂	3	2	-	2	1	-	2	3	3	1	3
CLO ₃	2	2	1	2	1	2	3	3	3	3	3

Content Mapping with NEP thrust areas

Field	Hours devoted
Employability	25
Entrepreneurship	-
Skill Enhancement	30
Communication Development	-
Indian Knowledge System	-
Environmental Awareness/SDGs	15
Current Issues and Social Awareness	8
Gender issues	-
Public policies	-
Any Other	-

Part A – Introduction			
Name of Subject	Zoology		
Semester	I		
Nature of Course/Course Composition	Theory + Practical		
Nomenclature of the Course	Basics of Zoology-I		
Course Code	26L4.5 MDC ZOO-101		
Course Type	MDC-1 (3 credit)		
Course Level	100-199		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLOs) After completing this course, the learner will be able to:	CLO ₁	Explain the scope of Zoology, animal diversity, and the characteristics of Protozoa, Porifera, Coelenterata, and Annelida, including their ecological and economic importance.	
	CLO ₂	Describe the characteristics and significance of Arthropoda, Mollusca, and Echinodermata, with emphasis on their ecological and economic importance.	
	CLO ₃	Identify representative non-chordates and interpret their morphology, classification, and life cycles through laboratory observations and specimen study.	
	Theory	Practical	Total
Credits	2	1	3
Teaching hours per week	2	2	4
Internal Assessment Marks	15	05	20
End Term Exam Marks	35	20	55
Max. Marks	50	25	75
Examination Duration (in Hours)	02	02	
Part B- Contents of the Course			
<u>Instructions for Theory Paper-Setter</u>			
The paper setter shall prepare 5 questions selecting two questions from each of the two units with consideration given to the Course Learning Outcomes. Among these, question number 1 will be compulsory question comprising 7 short answer type questions carrying one mark each (total 07 marks) and covering the entire syllabus. The remaining questions will be carrying 14 marks each. Examinees will be required to attempt three questions: the compulsory question no. 1 and 1 question from the each of the two units.			
<u>Instructions for Practical Examiner</u>			
Write-up and execution of the practical will be conducted as per the nature of the practical by the external examiner, with consideration given to the Course Learning Outcomes.			
	Topics	CLO/s Attempt	Contact Hours
Unit-I	Zoology: Definition and scope, introduction to Animal Kingdom, animal characters Non-Chordates and Invertebrates with examples, Invertebrate Phyla, Introduction to basic characters of animal with special reference to the non	1	16

	chordates; Biodiversity: Introduction and Scope; General characters of Protozoa and Porifera; Study of Amoeba and sponges with special reference to its structure and economic importance General characters of Coelentrata and Annelida; Ecological importance of corals; Morphology of earthworm and its ecological role; Economic importance of Leech				
Unit-II	General characters of Arthropoda and Mollusca; Study of basic characters of insects and snails; Insects as pest: Grasshopper, Economic importance of Honey Bee; Snails as pest in Paddy fields General characters of Echinodermata; Study of basic characters of Star fish with reference to its role in ecosystem; Economic importance of Star Fish	2	14		
Practical Components	1. To study the non chordates from pond water 2. To study the different parts of Insects by examining Housefly, butterfly, beetles 3. To study the characters of burrowing non chordates e.g. Earthworm 4. To study the life cycle of Butterfly/Mosquito 5. To study various minor phyla as connecting link 6. Identifications of Non-Chordates specimens of various phyla 7. To study the diversity of butterflies on the campus using line transect or random walk method and prepare a checklist of butterfly species 8. To prepare a simple insect collection (5–10 common insects) from the campus, identify them.	3	30		
Total		60			
Evaluation Methods					
Internal Assessment	TH-15	PR-5	End Term Examination: 55	TH-35	PR-20
Class Participation:	5	0	Lab record	NA	05
Seminar/presentation/assignment /quiz/class test etc.:	5	NA	Viva-Voce	NA	05
Seminar/Demonstration/Viva-voce/Lab records etc.:	NA	5	Written Examination	35	NA
Mid-Term Exam:	5	NA	Write-up and execution of the practical	NA	10
Part C-Learning Resources					
Recommended Books/Journals/ e-resources/ Learning Management Systems (LMS):					
1. Jordan, E. L., and Verma, P. S. (2025). Invertebrate zoology (14th rev. ed.). S. Chand Publishing, New Delhi.					
2. Kotpal, R. L. (2021). Modern textbook of zoology: Invertebrates (12th ed.). Rastogi Publications, Meerut.					
3. Lal, S. S. (2023). Practical zoology: Invertebrates (12th ed.). Rastogi Publications, Meerut.					
4. Brusca, R. C., Giribet, G., and Moore, W. (2022). Invertebrates (4th ed.). Oxford University					

- Press
- Schierwater, B. and Desalle, R. (2021). *Invertebrate zoology: A tree of life approach*. CRC Press
 - Barnes, R. D., Ruppert, E. E., & Fox, R. S. (2007). *Invertebrate zoology* (7th ed.). Cengage Learning.
 - Nair, N. C., Arumugam, N., Soundarapandian, N., Murugan, T., and Leelavathy, S. (2010). A textbook of invertebrates. Saras Publication, Nagercoil.

E-resources

- https://mlsu.ac.in/econtents/4190_practical-zoology-invertebrate.pdf
- <https://www.egyankosh.ac.in/bitstream/123456789/69616/2/Block-4.pdf>
- <https://uou.ac.in/sites/default/files/slm/MSCZO-501.pdf>
- https://dspace.sxcjpr.edu.in/jspui/bitstream/123456789/718/1/2001_Barnes_et_al_%28%28The%20Invertebrates_%20A%20Synthesis%29.pdf
- <https://assets.vmu.ac.in/MZO01.pdf>

Mapping of Course Learning Outcomes (CLOs) to Program Learning Outcomes (PLOs)

CLOs	PLO ₁	PLO ₂	PLO ₃	PLO ₄	PLO ₅	PLO ₆	PLO ₇	PLO ₈	PLO ₉	PLO ₁₀	PLO ₁₁
CLO ₁	3	2	-	2	1	-	2	2	2	2	3
CLO ₂	3	2	-	2	1	-	2	2	2	2	3
CLO ₃	3	2	1	2	1	2	3	3	3	2	3

Content Mapping with NEP thrust areas

Field	Content/s
Employability	15
Entrepreneurship	3
Skill Enhancement	30
Communication Development	-
Indian Knowledge System	-
Environmental Awareness/SDGs	10
Current Issues and Social Awareness	6
Gender issues	-
Public policies	-
Any Other	-

Part A – Introduction			
Name of Subject	Zoology		
Semester	II		
Nature of Course/Course Composition	Theory + Practical		
Nomenclature of the Course	Basics of Zoology-II		
Course Code	26L4.5 MDC ZOO-201		
Course Type	MDC- 2 (3 credit)		
Course Level	100-199		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLOs) After completing this course, the learner will be able to:	CLO ₁	Explain the salient features of chordates and the characteristics, diversity, and economic importance of protochordates, fishes, and amphibians.	
	CLO ₂	Describe the characteristics, identification, adaptations, ecological roles, and economic importance of reptiles, birds, and mammals.	
	CLO ₃	Identify representative chordates, connecting links, feathers, local fish species, and nesting patterns through laboratory and field observations.	
	Theory	Practical	Total
Credits	2	1	3
Teaching hours per week	2	2	4
Internal Assessment Marks	15	05	20
End Term Exam Marks	35	20	55
Max. Marks	50	25	75
Examination Duration (in Hours)	02	02	
Part B- Contents of the Course			
<u>Instructions for Theory Paper-Setter</u>			
The paper setter shall prepare 5 questions selecting two questions from each of the two units with consideration given to the Course Learning Outcomes. Among these, question number 1 will be compulsory question comprising 7 short answer type questions carrying one mark each (total 07 marks) and covering the entire syllabus. The remaining questions will be carrying 14 marks each. Examinees will be required to attempt three questions: the compulsory question no. 1 and 1 question from the each of the two units.			
<u>Instructions for Practical Examiner</u>			
Write-up and execution of the practical will be conducted as per the nature of the practical by the external examiner, with consideration given to the Course Learning Outcomes.			
	Topics	CLO/s Attempt	Contact Hours
Unit-I	Basics of Chordates: Define and Salient features of chordates, Difference between non chordates and chordates. Characters of protochordates Pisces (Fishes): Characteristic features of freshwater and marine fishes, Edible fishes of India, Composite fish culture. Class Amphibia: Features of amphibians,	1	15

	Parental care in amphibians, Role of amphibians in ecosystem, Identification of turtles and tortoise, Frog and Toad.				
Unit-II	Class Reptilia: Features of Reptiles, Common reptiles of India, Identification of Poisonous and non poisonous snakes, Difference between crocodile and Gharial Class Aves: Characteristic features of birds, Common birds of India, Flight adaptations in birds, Commercial uses of birds, Role of birds in agriculture. Class Mammals: Characters and economic importance of mammals	2	15		
Practical Components	1. Identifying feature of different class of chordates 2. Study of connecting links in chordates 3. Study of different types of feathers. 4. Study of different local species of fishes 5. Study of nesting pattern of some local birds, mammals 6. Identifications of Chordates specimens of various phyla 7. To study the external morphology and adaptive features of common local birds (beak, feet, wings, and tail) and correlate them with their feeding habits and habitat. 8. To prepare a checklist of common birds on the university campus using direct observation and identify them with the help of field guides.	3	30		
Total		60			
Evaluation Methods					
Internal Assessment	TH-15	PR-5	End Term Examination: 55	TH-35	PR-20
Class Participation:	5	0	Lab record	NA	05
Seminar/presentation/assignment /quiz/class test etc.:	5	NA	Viva-Voce	NA	05
Seminar/Demonstration/Viva-voce/Lab records etc.:	NA	5	Written Examination	35	NA
Mid-Term Exam:	5	NA	Write-up and execution of the practical	NA	10
Part C-Learning Resources					
Recommended Books/Journals/ e-resources/ Learning Management Systems (LMS):					
1. Kotpal, R. L. (2010). <i>Modern textbook of zoology: Vertebrates</i> . Rastogi Publications.					
2. Jordan, E. L., & Verma, P. S. (2014). <i>Chordate zoology</i> (15th ed.). S. Chand Publishing					
3. Barrington, E. J. W. (1965). <i>The biology of Hemichordata and Protochordata</i> . Oliver & Boyd.					
4. Walters, H. E., & Sayles, L. P. (1961). <i>Biology of vertebrates</i> . Macmillan.					
5. Kent, G. C., & Carr, R. K. (2001). <i>Comparative anatomy of the vertebrates</i> (9th ed.). McGraw-Hill Higher Education.					
6. Lal, S. S. (2019). <i>Practical zoology: Vertebrate</i> . Rastogi Publications.					

E-resources

1. https://dpbck.ac.in/wp-content/uploads/2023/06/3.-Vertebrate-Kotpal_compressed.pdf
2. <https://archive.org/details/in.ernet.dli.2015.279718/page/n769/mode/2up>
3. [https://www.mlsu.ac.in/econtents/758_PRACTICAL%20ZOOLOGY%20%20VERTEBRATE%20\(%20PDFDrive%20\).pdf](https://www.mlsu.ac.in/econtents/758_PRACTICAL%20ZOOLOGY%20%20VERTEBRATE%20(%20PDFDrive%20).pdf)
4. <https://uou.ac.in/sites/default/files/slm/MSCZO-601.pdf>

Mapping of Course Learning Outcomes (CLOs) to Program Learning Outcomes (PLOs)

CLOs	PLO ₁	PLO ₂	PLO ₃	PLO ₄	PLO ₅	PLO ₆	PLO ₇	PLO ₈	PLO ₉	PLO ₁₀	PLO ₁₁
CLO ₁	3	2	-	2	1	-	2	2	2	1	3
CLO ₂	3	2	-	2	1	-	2	2	2	1	3
CLO ₃	2	2	1	2	1	2	3	3	2	3	3

Content Mapping with NEP thrust areas

Field	Content/s
Employability	16
Entrepreneurship	4
Skill Enhancement	30
Communication Development	-
Indian Knowledge System	-
Environmental Awareness/SDGs	10
Current Issues and Social Awareness	8
Gender issues	-
Public policies	-
Any Other	-

Part A – Introduction			
Name of Subject	Zoology		
Semester	III		
Nature of Course/Course Composition	Theory + Practical		
Nomenclature of the Course	Basics of Zoology-III		
Course Code	26L4.5 MDC ZOO-301		
Course Type	MDC-3 (3 credit)		
Course Level	200-299		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLOs) After completing this course, the learner will be able to:	CLO ₁	Explain the structure and functions of the human cell, chromosomes, sex determination, blood group systems, skeletal system, and dentition.	
	CLO ₂	Describe the anatomy and physiology of the human respiratory system and explain the concepts and mechanisms of evolution, including Darwinism, speciation, Hardy–Weinberg law, genetic drift, and human evolution.	
	CLO ₃	Perform laboratory investigations related to human anatomy, cytology, blood grouping, chromosome studies, and evidences of evolution.	
	Theory	Practical	Total
Credits	2	1	3
Teaching hours per week	2	2	4
Internal Assessment Marks	15	05	20
End Term Exam Marks	35	20	55
Max. Marks	50	25	75
Examination Duration (in Hours)	02	02	
Part B- Contents of the Course			
<u>Instructions for Theory Paper-Setter</u>			
The paper setter shall prepare 5 questions selecting two questions from each of the two units with consideration given to the Course Learning Outcomes. Among these, question number 1 will be compulsory question comprising 7 short answer type questions carrying one mark each (total 07 marks) and covering the entire syllabus. The remaining questions will be carrying 14 marks each. Examinees will be required to attempt three questions: the compulsory question no. 1 and 1 question from the each of the two units.			
<u>Instructions for Practical Examiner</u>			
Write-up and execution of the practical will be conducted as per the nature of the practical by the external examiner, with consideration given to the Course Learning Outcomes.			
	Topics	CLO/s Attempt	Contact Hours
Unit-I	Human Cell: Cell as the structural and functional unit of life; organization of the human cell; major cell organelles and their functions. Human Chromosomes: Morphology, types and functional elements of human chromosomes.	1	15

	Sex Determination: Definition; chromosomal mechanisms and different types of sex determination; biological significance. ABO and Rh Blood Group Systems: Principles, methods of blood group determination, importance of blood groups, blood transfusion, compatibility and incompatibility. Human Skeletal System: Characteristics of the axial and appendicular skeleton; joints, cartilage and ligaments; interaction between skeletal muscles and the nervous system. Dentition: Dental formula, types of teeth and development of teeth.		
Unit-II	Respiration in Humans: Anatomy and physiology of the respiratory system; mechanism of breathing; gaseous exchange; factors affecting diffusion and respiratory efficiency. Concept of Evolution: Origin of evolutionary thought and evidence for evolution. Darwinism and Neo-Darwinism: Principles, natural selection and modern synthetic theory of evolution. Species and Population: Concept of species, population and mechanisms of speciation. Hardy-Weinberg Law and Genetic Drift: Principle of genetic equilibrium, assumptions, applications and factors affecting allele frequencies. Human Evolution: Origin and evolution of humans; adaptive evolution and major evolutionary trends.	2	15
Practical Components	1. Study of human bones: Skull, vertebrae, girdles and limb bones. 2. Preparation of mitotic chromosomes from onion root tips. 3. Study of permanent slides of mitosis and meiosis. 4. Determination of human ABO and Rh blood groups. 5. Study of human chromosome morphology and karyotype. 6. Study of different types of human teeth and dental formula. 7. Identification of different types of human joints using models. 8. Study of the human respiratory system using charts/models. 9. Identification of fossil stages of human evolution using charts/models. 10. Study of homologous, analogous and	3	30

	vestigial organs as evidences of evolution			
Total			60	
Evaluation Methods				
Internal Assessment	TH-15	PR-5	End Term Examination: 55	TH-35 PR-20
Class Participation:	5	0	Lab record	NA 05
Seminar/presentation/assignment/quiz/class test etc.:	5	NA	Viva-Voce	NA 05
Seminar/Demonstration/Viva-voce/Lab records etc.:	NA	5	Written Examination	35 NA
Mid-Term Exam:	5	NA	Write-up and execution of the practical	NA 10
Part C-Learning Resources				
Recommended Books/Journals/ e-resources/ Learning Management Systems (LMS):				
1. Reece, J. B., Urry, L. A., Cain, M. L., Wasserman, S. A., Minorsky, P. V., & Jackson, R. B. (2024). <i>Campbell biology</i> (13th ed.). Pearson.				
2. Tortora, G. J., & Derrickson, B. (2023). <i>Principles of anatomy and physiology</i> (17th ed.). John Wiley & Sons.				
3. Pierce, B. A. (2023). <i>Genetics: A conceptual approach</i> (8th ed.). W. H. Freeman and Company.				
4. Kardong, K. V. (2019). <i>Vertebrates: Comparative anatomy, function, evolution</i> (8th ed.). McGraw-Hill Education.				
5. Verma, P. S., & Agarwal, V. K. (2021). <i>Cell biology, genetics, molecular biology, evolution and ecology</i> . S. Chand Publishing.				
6. Kotpal, R. L. (2020). <i>Modern textbook of zoology: Vertebrates</i> (Revised ed.). Rastogi Publications.				
7. Chatterjee, C. C. (2021). <i>Human physiology</i> (13th ed.). CBS Publishers & Distributors Pvt. Ltd.				
8. Singh, H. R. (2020). <i>Human genetics</i> (4th ed.). Rastogi Publications.				
e-resources				
1. https://dpbck.ac.in/wp-content/uploads/2022/09/Cell-Biology-Verma-and-Agarwal.pdf				
2. https://uou.ac.in/sites/default/files/slm/BSCZO-103.pdf				
3. https://tsjok45.wordpress.com/wp-content/uploads/2011/01/evolution_3rd_edition-ridley-book.pdf				
4. https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/1/PG_M.S.W._Social%20Work_365%2011_Human%20Physiology_English_8111.pdf				
5. https://uou.ac.in/sites/default/files/slm/BSCZO-301.pdf				

Mapping of Course Learning Outcomes (CLOs) to Program Learning Outcomes (PLOs)

CLOs	PLO ₁	PLO ₂	PLO ₃	PLO ₄	PLO ₅	PLO ₆	PLO ₇	PLO ₈	PLO ₉	PLO ₁₀	PLO ₁₁
CLO ₁	3	2	-	2	1	-	3	3	3	2	3
CLO ₂	3	2	-	2	1	-	3	3	3	2	3
CLO ₃	2	2	1	3	1	2	3	3	2	2	3

Content Mapping with NEP thrust areas

Field	Content/s
Employability	20
Entrepreneurship	-
Skill Enhancement	30
Communication Development	-
Indian Knowledge System	-
Environmental Awareness/SDGs	8
Current Issues and Social Awareness	7
Gender issues	-
Public policies	-
Any Other	-

SEC-SKILL ENHANCEMENT COURSE

Part A – Introduction			
Name of Subject	Zoology		
Semester	II		
Nature of Course/Course Composition	Theory + Practical		
Nomenclature of the Course	Taxidermy		
Course Code	26L4.5 SEC- ZOO-201		
Course Type	SEC-2		
Course Level	100-199		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLOs) After completing this course, the learner will be able to:	CLO ₁	Explain the principles, history, types, applications, and layout of taxidermy, including skinning, preservation techniques, and record-keeping of animal specimens.	
	CLO ₂	Demonstrate knowledge of taxidermy methods for fishes, snakes, and birds, including the use of instruments, maceration, tanning procedures, ethical considerations, and the role of taxidermy in conservation and education.	
	CLO ₃	Perform basic taxidermy-related practical skills by identifying museum specimens, preparing animal models, studying taxidermy procedures, and recognizing the chemicals and instruments used in taxidermy.	
	Theory	Practical	Total
Credits	2	1	3
Teaching hours per week	2	2	4
Internal Assessment Marks	15	05	20
End Term Exam Marks	35	20	55
Max. Marks	50	25	75
Examination Duration (in Hours)	02	02	
Part B- Contents of the Course			
<u>Instructions for Theory Paper-Setter</u>			
The paper setter shall prepare 5 questions selecting two questions from each of the two units with consideration given to the Course Learning Outcomes. Among these, question number 1 will be compulsory question comprising 7 short answer type questions carrying one mark each (total 07 marks) and covering the entire syllabus. The remaining questions will be carrying 14 marks each. Examinees will be required to attempt three questions: the compulsory question no. 1 and 1 question from the each of the two units.			
<u>Instructions for Practical Examiner</u>			
Write-up and execution of the practical will be conducted as per the nature of the practical by the external examiner, with consideration given to the Course Learning Outcomes.			
	Topics	CLO/s Attempt	Contact Hours
Unit-I	General introduction to Taxidermy; Past and	1	15

	present scenario of Taxidermy; Types of Taxidermy for different animals; Applications of taxidermy Layout of Taxidermy- Techniques and Materials used for Skinning, Cleaning and Preservation of dead animals; Keeping the record of dead animal-age, sex, infestation of pests				
Unit-II	Methods of Taxidermy in Fishes, Snakes and Birds; Instruments used in Taxidermy; Maceration; Chemical treatments and procedure of Tanning Economic importance of Taxidermy; Role of Taxidermy in conservation and education; Factors affecting Taxidermy; Ethical issues; Pros and cons of Taxidermy	2	15		
Practical Components	1. Visit to the museum; 2. Identification of animals in Museum; 3. Prepare small models of animals; 4. To study the best and easiest method of Taxidermy of Birds; 5. Procedure of Taxidermy in mammals; Enlist the different types of chemicals used for Taxidermy; 6. Enlist the different types of instruments used for taxidermy	3	30		
Total Contact Hours			60		
Evaluation Methods					
Internal Assessment:20	TH-15	PR-5	End Term Examination: 55	TH-35	PR-20
Class Participation:	5	0	Lab record	NA	05
Seminar/presentation/assignment /quiz/class test etc.:	5	NA	Viva-Voce	NA	05
Seminar/Demonstration/Viva-voce/Lab records etc.:	NA	5	Written Examination	35	NA
Mid-Term Exam:	5	NA	Write-up and execution of the practical	NA	10
Part C-Learning Resources					
Recommended Books/Journals/ e-resources/ Learning Management Systems (LMS):					
Instructions					
1. Grantz, G. J. (1985). <i>Home book of taxidermy and tanning</i> . Stackpole Books.					
2. McConnaughay, T. J. (2015). <i>Barber's manual: A textbook on taxidermy</i> (Reprint ed.). Literary Licensing, LLC. (Original work published 1908)					
3. Pray, L. (2017). <i>Taxidermy</i> . Forgotten Books. (Reprint of the classic edition)					
4. Turner, A. (2019). <i>Taxidermy</i> . Rizzoli International Publications.					
5. Brown, L. (1983). <i>Taxidermy: Step by step</i> . David & Charles.					
6. Batty, J. (2013). <i>Practical taxidermy and home decoration</i> (Reprint ed.). Skyhorse Publishing. (Original work published 1885)					
7. Cresson, B. (2010). <i>The complete guide to taxidermy</i> . Lyons Press.					
8. Davis, J. (2014). <i>The beginner's guide to taxidermy</i> . Schiffer Publishing.					
E-resources					

1. <https://dn790000.ca.archive.org/0/items/cu31924022540151/cu31924022540151.pdf>
2. <https://www.gutenberg.org/files/26014/26014-h/26014-h.htm>
3. <https://dn790000.ca.archive.org/0/items/cu31924022556272/cu31924022556272.pdf>

Mapping of Course Learning Outcomes (CLOs) to Program Learning Outcomes (PLOs)

CLOs	PLO ₁	PLO ₂	PLO ₃	PLO ₄	PLO ₅	PLO ₆	PLO ₇	PLO ₈	PLO ₉	PLO ₁₀	PLO ₁₁
CLO ₁	3	2	-	2	-	-	3	3	3	2	2
CLO ₂	3	2	-	2	-	-	3	3	3	2	2
CLO ₃	2	2	1	3	1	2	3	3	3	3	3

Content Mapping with NEP thrust areas

Field	Hours devoted
Employability	22
Entrepreneurship	6
Skill Enhancement	30
Communication Development	-
Indian Knowledge System	-
Environmental Awareness/SDGs	10
Current Issues and Social Awareness	8
Gender issues	-
Public policies	-
Any Other	-

Part A – Introduction			
Name of Subject	Zoology		
Semester	II		
Nature of Course/Course Composition	Theory + Practical		
Nomenclature of the Course	Techniques in Bird Watching		
Course Code	26L4.5 SEC- ZOO-202		
Course Type	SEC-2		
Course Level	100-199		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLOs) After completing this course, the learner will be able to:	CLO ₁	Explain the basic principles of ornithology and identify common birds using their external morphology, field characters, plumage, beak, feet and flight adaptations.	
	CLO ₂	Describe bird migration, ecological roles, Important Bird Areas (IBAs), conservation issues and the applications of citizen science in bird monitoring and biodiversity conservation.	
	CLO ₃	Demonstrate field skills in bird identification, observation, checklist preparation, use of bird-watching equipment and citizen science platforms, and prepare scientific field records and reports.	
	Theory	Practical	Total
Credits	2	1	3
Teaching hours per week	2	2	4
Internal Assessment Marks	15	05	20
End Term Exam Marks	35	20	55
Max. Marks	50	25	75
Examination Duration (in Hours)	02	02	
Part B- Contents of the Course			
<u>Instructions for Theory Paper-Setter</u>			
The paper setter shall prepare 5 questions selecting two questions from each of the two units with consideration given to the Course Learning Outcomes. Among these, question number 1 will be compulsory question comprising 7 short answer type questions carrying one mark each (total 07 marks) and covering the entire syllabus. The remaining questions will be carrying 14 marks each. Examinees will be required to attempt three questions: the compulsory question no. 1 and 1 question from the each of the two units.			
<u>Instructions for Practical Examiner</u>			
Write-up and execution of the practical will be conducted as per the nature of the practical by the external examiner, with consideration given to the Course Learning Outcomes.			
	Topics	CLO/s Attempt	Contact Hours
Unit-I	Introduction to Bird Watching and Ornithology Characteristics of Birds and Flight Adaptations External Morphology and Feather Types Important Field Signs for Bird Identification	1	15

	Common and Zoological Names of Important Indian Birds Identification of Common Birds Based on Beak, Feet, Plumage and Flight Pattern Sexual Dimorphism in Birds		
Unit-II	Resident and Migratory Birds Bird Migration: Types and Flyways Birds as Bio-indicators of Environmental Health Ecological Role of Birds in Food Chains and Agriculture Important Bird Areas (IBAs) of India Important Bird Areas and Wetlands of Haryana Threats to Bird Diversity and Conservation Measures Ethical Bird Watching Introduction to Citizen Science Platforms (eBird, Merlin Bird ID and iNaturalist) Career Opportunities in Ornithology, Wildlife Research, Ecotourism and Forest Services	2	15
Practical Components	1. Study of bird watching instruments (binoculars, spotting scope, field guide, GPS and camera). 2. Identification of common birds using field characters and field guides. 3. Identification of birds based on beak types, feet types and plumage. 4. Study of sexual dimorphism in selected bird species. 5. Identification of resident and migratory birds. 6. Preparation of a bird checklist from the local area. 7. Observation of feeding behaviour and feeding guilds. 8. Recording bird observations using eBird or Merlin Bird ID. 9. Preparation of a bird field diary with photographs or sketches. 10. Field visit to a local bird habitat (wetland, forest, agricultural land or university campus) and submission of a field report.	3	30
Total Contact Hours			60

Evaluation Methods					
Internal Assessment:20	TH-15	PR-5	End Term Examination: 55	TH-35	PR-20
Class Participation:	5	0	Lab record	NA	05
Seminar/presentation/assignment/quiz/class test etc.:	5	NA	Viva-Voce	NA	05
Seminar/Demonstration/Viva-voce/Lab records etc.:	NA	5	Written Examination	35	NA
Mid-Term Exam:	5	NA	Write-up and execution of the practical	NA	10
Part C-Learning Resources					
Recommended Books/Journals/ e-resources/ Learning Management Systems (LMS): Instructions - Grimmett, R., Inskipp, C., & Inskipp, T. (2026). <i>Field guide to birds of the Indian subcontinent</i> (2nd ed.). Bloomsbury Publishing. - Inskipp, T., Grimmett, R., & Inskipp, C. (2026). <i>Birds of India: Pakistan, Nepal, Bangladesh, Bhutan, Sri Lanka, and the Maldives</i> (3rd ed.). Princeton University Press. - Lovette, I. J., & Fitzpatrick, J. W. (Eds.). (2016). <i>Handbook of bird biology</i> (3rd ed.). John Wiley & Sons. - Gill, F. B. (2019). <i>Ornithology</i> (4th ed.). W. H. Freeman. - Newton, I. (2008). <i>The migration ecology of birds</i>. Academic Press. - Ali, S. (2002). <i>The book of Indian birds</i> (13th ed.). Bombay Natural History Society & Oxford University Press. - Sutherland, W. J., Newton, I., & Green, R. E. (Eds.). (2004). <i>Bird ecology and conservation: A handbook of techniques</i>. Oxford University Press. - Bibby, C. J., Burgess, N. D., Hill, D. A., & Mustoe, S. H. (2000). <i>Bird census techniques</i> (2nd ed.). Academic Press. E-resources https://www.natureclubsurat.org/wp-content/uploads/Birds-of-Indian-Subcontinent.pdf https://www.ainpvp.in/Archive/Manual/Manual%20on%20field%20ornithology.pdf https://txmn.org/elcamino/files/2010/03/Ornithology-Basic-Concepts.pdf					

Mapping of Course Learning Outcomes (CLOs) to Program Learning Outcomes (PLOs)

CLOs	PLO ₁	PLO ₂	PLO ₃	PLO ₄	PLO ₅	PLO ₆	PLO ₇	PLO ₈	PLO ₉	PLO ₁₀	PLO ₁₁
CLO ₁	3	2	-	2	1	-	2	2	3	2	3
CLO ₂	3	2	-	3	1	-	3	2	3	2	3
CLO ₃	2	3	2	2	1	2	3	3	3	3	3

Content Mapping with NEP thrust areas

Field	Hours devoted
Employability	20
Entrepreneurship	6
Skill Enhancement	30
Communication Development	5
Indian Knowledge System	-
Environmental Awareness/SDGs	18

Current Issues and Social Awareness	10
Gender issues	-
Public policies	-
Any Other	-

Part A – Introduction			
Name of Subject	Zoology		
Semester	II		
Nature of Course/Course Composition	Theory + Practical		
Nomenclature of the Course	Camera Trapping in Wildlife Studies		
Course Code	26L4.5 SEC- ZOO-203		
Course Type	SEC-2		
Course Level	100-199		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLOs) After completing this course, the learner will be able to:	CLO ₁	Explain the principles, types, components, applications, and ethical considerations of camera trapping in wildlife research and conservation	
	CLO ₂	Demonstrate the planning, installation, operation, and maintenance of camera traps, and organize camera trap data for wildlife monitoring.	
	CLO ₃	Analyze camera trap data to identify species, estimate Relative Abundance Index (RAI), species richness, and prepare scientific field reports using basic data analysis tools.	
	Theory	Practical	Total
Credits	2	1	3
Teaching hours per week	2	2	4
Internal Assessment Marks	15	05	20
End Term Exam Marks	35	20	55
Max. Marks	50	25	75
Examination Duration (in Hours)	02	02	
Part B- Contents of the Course			
<u>Instructions for Theory Paper-Setter</u>			
The paper setter shall prepare 5 questions selecting two questions from each of the two units with consideration given to the Course Learning Outcomes. Among these, question number 1 will be compulsory question comprising 7 short answer type questions carrying one mark each (total 07 marks) and covering the entire syllabus. The remaining questions will be carrying 14 marks each. Examinees will be required to attempt three questions: the compulsory question no. 1 and 1 question from the each of the two units.			
<u>Instructions for Practical Examiner</u>			
Write-up and execution of the practical will be conducted as per the nature of the practical by the external examiner, with consideration given to the Course Learning Outcomes.			
	Topics	CLO/s Attempt	Contact Hours
Unit-I	Introduction to camera trapping; history and importance of camera trapping in wildlife research; principles of camera trap operation; types of camera traps and their components; camera trap	1	15

	sensors and flash systems; camera settings and operating modes (photo, video, burst, time-lapse); selection of camera traps for different habitats and wildlife species; advantages and limitations of camera trapping; applications in wildlife monitoring, biodiversity assessment, behavioural studies, and conservation; ethical and safety considerations during camera trap surveys.		
Unit-II	Survey planning and site selection; identification of animal signs for camera placement; installation and maintenance of camera traps; collection and organization of camera trap data; species identification from photographs; preparation of camera trap datasheets; introduction to Relative Abundance Index (RAI), species richness, and activity patterns; basic image management and data analysis using Microsoft Excel or camera trap software; applications of camera trapping in wildlife conservation and protected area management.	2	15
Practical Components	1. Study of different types and parts of camera traps. 2. Programming and setting up a camera trap. 3. Selection of suitable camera trap locations using animal signs. 4. Installation and testing of camera traps in the field. 5. Recording GPS location and maintaining field datasheets. 6. Retrieval of camera traps and downloading photographs/videos. 7. Preparation of a photographic checklist and camera trap database. 8. Estimation of Relative Abundance Index (RAI) and species richness using camera trap data. 9. Preparation and presentation of a field report based on camera trap survey. 10. Field visit for installation, monitoring, retrieval, and data collection using camera traps in a forest, wetland, biodiversity park, or university campus.	3	30
Total Contact Hours			60

Evaluation Methods					
Internal Assessment:20	TH-15	PR-5	End Term Examination: 55	TH-35	PR-20
Class Participation:	5	0	Lab record	NA	05
Seminar/presentation/assignment/quiz/class test etc.:	5	NA	Viva-Voce	NA	05
Seminar/Demonstration/Viva-voce/Lab records etc.:	NA	5	Written Examination	35	NA
Mid-Term Exam:	5	NA	Write-up and execution of the practical	NA	10
Part C-Learning Resources					
Recommended Books/Journals/ e-resources/ Learning Management Systems (LMS): Instructions • 05 to 15 relevant books and recommended learning materials may be included. • Hindi-medium books may also be included wherever applicable. • Preference should be given to the latest editions and publications from reputed publishers. • E-resources and LMS should also be included as learning resources wherever relevant. • All references should be formatted in accordance with APA style guidelines.					

Mapping of Course Learning Outcomes (CLOs) to Program Learning Outcomes (PLOs)

CLOs	PLO ₁	PLO ₂	PLO ₃	PLO ₄	PLO ₅	PLO ₆	PLO ₇	PLO ₈	PLO ₉	PLO ₁₀	PLO ₁₁
CLO ₁	3	2	-	3	1	2	2	2	3	2	3
CLO ₂	3	2	2	2	1	2	3	2	3	2	3
CLO ₃	2	3	2	2	1	2	3	3	3	3	3

Content Mapping with NEP thrust areas

Field	Hours devoted
Employability	20
Entrepreneurship	-
Skill Enhancement	30
Communication Development	6
Indian Knowledge System	-
Environmental Awareness/SDGs	15
Current Issues and Social Awareness	8
Gender issues	-
Public policies	-
Any Other	-