

SEMESTER – I

Course Code 23BZOA1	Course Name	Category	L	T	P	S		Inst Hours	Marks		
									Internal	External	Total
	Allied Zoology I	Allied	Y	-	-	-	3	3	25	75	100
Learning Objectives											
CO1	To acquire a basic knowledge of diversity and organization of Protozoa,Coelenterata, Helminthes and Annelida										
CO2	To acquire a basic knowledge of diversity and organization of Arthropoda,Mollusca and Echinodermata										
CO3	To comprehend the taxonomic position and diversity among Protochordata,Pisces and Amphibia										
CO4	To comprehend the taxonomic position and diversity among Reptilia, Aves and Mammalia										
CO5	To acquire detailed knowledge of select invertebrate and chordate forms										
	Details								No. of Hours	Course Objectives	
UNIT I	Diversity of Invertebrates–I Principles of taxonomy. Criteria for classification–Symmetry and Coelom–Binomial nomenclature. Classification of Protozoa, Coelenterata, HelminthesandAnnelidauptoclasses withtwoexamples.									CO1	
UNIT II	Diversity of Invertebrates–II Classification of Arthropoda, Mollusca and Echinodermat aupto class level with examples.									CO2	
UNIT III	DiversityofChordates–I ClassificationofProchordata,PiscesandAmphibiauptoord ersgivingtwoexamples.									CO3	
UNIT IV	Diversityof Chordates–II ClassificationofReptilia,AvesandMammaliauptoord ersgi vingtwoexamples.									CO4	
UNIT V	Animalorganisation Structureandorganizationof(i).Earthworm (ii)Rabbit(iii)Prawn									CO5	
Course Outcomes											
Course Outcomes	On completion of this course, students will;										
CO1	Recall the characteristic features invertebrates and chordates.								PO1		
CO2	Classify invertebrates up to class level and chordates up to order level								PO1, PO2		
CO3	Explain and discuss the structural and functional organisation of some invertebrates and chordates								PO4, PO6		
CO4	Relate the adaptations and habits of animals to their habitat								PO4, PO5, PO6		
CO5	Analyse the taxonomic position of animals.								PO3, PO8		
Text Books (Latest Editions)											
1.	Ekambaranatha Iyer,-OutlinesofZoologyViswanathanPublication										

References Books (Latest editions, and the style as given below must be strictly adhered to)	
1.	Ekambaranatha Iyar and T.N.Ananthakrishnian - A Manual
2.	EkambaranathaIyarandT.N.Ananthakrishnan,-AManualofZoology-Invertebrata–VolIII:ViswanathanPublishors.
3.	EkambaranathaIyarandT.N.Ananthakrishnan,-AManualofZoology:ChordataViswanathanPublishers.
4.	JordanE.L.andP.S. Verma-Invertebrate Zoology,S.Chand&Co.
Web Resources	
1.	www.sanctuaryasia.com
2.	www.iaszoology.com

Methods of Evaluation		
Internal Evaluation	Continuous Internal Assessment Test	25 Marks
	Assignments	
	Seminars	
	Attendance and Class Participation	
External Evaluation	End Semester Examination	75 Marks
	Total	100 Marks
Methods of Assessment		
Recall (K1)	Simple definitions, MCQ, Recall steps, Concept definitions	
Understand/ Comprehend(K2)	MCQ, True/False, Short essays, Concept explanations, Short summary or overview	
Application(K3)	Suggest idea/concept with examples, Suggest formulae, Solve problems, Observe, Explain	
Analyze (K4)	Problem-solving questions, Finish a procedure in many steps, Differentiate between various ideas, Map knowledge	
Evaluate (K5)	Longer essay/ Evaluation essay, Critique or justify with pros and cons	
Create (K6)	Check knowledge in specific or offbeat situations, Discussion, Debating or Presentations	

Mapping with Programme Outcomes:
S-Strong(3) M-Medium (2) L-Low (1)

SEMESTER - I

Course Code 23BZOAP1	Course Name	Category	L	T	P	S	Credits	Inst Hours	Marks		
									CI A	External	Total
	ALLIED ZOOLOGY LABCOURSE I		Y	-	-	-	2	2	25	75	100
Learning Objectives											
CO1	To identify the different groups of invertebrate animals by observing their external characteristics.										
CO2	To understand the organs, organ system and their functions in lower animals.										
CO3	To get knowledge about the different modes of life and their adaptation based on the environment.										
CO4	Able to dissect and display the internal organs and mount the mouthparts and scales of invertebrates.										
	Details								No. of Hours	Course Objectives	
UNIT I	Major Dissection : Cockroach: Digestive system. Circulatory system, Nervous system,. Earthworm: Nervous System, Digestive system Fish :Digestive System									CO1	
UNIT-II	Mounting: Earthworm: Body setae; Pineal setae. Cockroach and Mosquito mouth parts. Prawn appendages.									CO2	
UNIT III	Spotters: Paramecium,Plamodium,Scypha,Leucosolenia,Corals, Taenia solium-entire , Ascaris male and female. Earthworm,Prawn,Scorpion,Pila,Starfish Amphioxus,Shark,Frog,Cobra,Viper,Calotes,Pigeonfeather, Rabbit									CO3	
UNIT IV	Preserve any Two insect pests and prepare a report on its name,life cycle, damaging crops and management of the pests using different methods.									CO4	
UNIT V	Observation Note/Record									CO5	
Course Outcomes											
Course Outcomes	On completion of this course, students will;										
CO1	Identify and label the external features of different groups of invertebrate animals.								PO1		
CO2	Illustrate and examine the circulatory system, nervous system and reproductive system of invertebrate animals.								PO1, PO2		
CO3	Differentiate and compare the structure, function and mode of life of various groups of animals.								PO4, PO6		
CO4	To compare and distinguish the dissected internal organs of lower animals.								PO4, PO5, PO6		
CO5	Prepare and develop the mounting procedure of economically important invertebrates.								PO3, PO8		

Text Books (Latest Editions)	
1.	Ekambaranatha Iyyar and T. N. Ananthakrishnan, 1995 A manual of Zoology Vol.I (Part 1, 2) S. Viswanathan, Chennai
2.	Ganguly, Sinha and Adhikari, 2011. Biology of Animals: Volume I, New Central Book Agency; 3rd revised edition. 1008 pp.
3.	Sinha, Chatterjee and Chattopadhyay, 2014. Advanced Practical Zoology, Books & Allied Ltd; 3rd Revised edition, 1070 pp.
4.	Lal, S. S., 2016. Practical Zoology Invertebrate, Rastogi Publications.
5.	Verma, P. S. 2010. A Manual of Practical Zoology: Invertebrates, S Chand, 497pp.

References Books (Latest editions, and the style as given below must be strictly adhered to)	
1.	Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). <i>The Invertebrates: A New Synthesis</i> , III Edition, Blackwell Science.

2.	Barnes, R.D. (1982). <i>Invertebrate Zoology</i> , V Edition. Holt Saunders International Edition.
3.	Barrington, E.J.W. (1979). <i>Invertebrate Structure and Functions</i> . II Edition, E.L.B.S. and Nelson
4.	Boradale, L.A. and Potts, E.A. (1961). <i>Invertebrates: A Manual for the use of Students</i> . Asia Publishing Home.
5.	Lal, S.S. 2005. A text Book of Practical Zoology: Invertebrate, Rastogi, Meerut

Web Resources	
1.	https://nbb.gov.in/
2.	http://www.agshoney.com/training.htm
3.	https://icar.org.in/
4.	http://www.csrtimys.res.in/
5.	http://csb.gov.in/
	https://iinrg.icar.gov.in/
	https://www.nationalgeographic.com/animals/invertebrates/

SCHEME OF EVALUATION	
Dissect and display the digestive system of Cockroach/Dissect and display the digestive system and nervous system of Earthworm/Digestive system of Fish	15 Marks
Mounting Cockroach/Mosquito- mouth parts/Earthworm body setae and penial setae	10 Marks
Identify Sketch and comments on A,B,C,D &E	15 Marks
Preserve any two insect pest and submit a descriptive report about the pest ,infested plants,types of damage and natural way of control	10 Marks
Bona fide Record of the , work done in laboratory	10 Marks
Total	60 Marks

SEMESTER II

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BZOA2	Allied Zoology II	Allied	Y	-	-	-	3	3	25	75	100
Learning Objectives											
CO1	Toenablestudentstolearnbasicconceptsrelatingtoaspectsofrespiratory,circulatory,excretorynervousandsensoryphysiology.										
CO2	Toenablestudentstocomprehendtheprocessesinvolvedduringdevelopment										
CO3	Toenablestudentstolearnbasicconceptsofimmunityandtheworkingofimmuneorgansandfamiliarizethemwiththerecommendedvaccinationschedule										
CO4	Toenablestudentstocomprehendthebasicconceptsofhumangeneticsandpatternsofinheritance										
CO5	Toenablestudentstolearnaboutaspectsofanimalbehavioursuchasforaging,courtship,nestconstruction,parentalcareandlearning										
	Details								No. of Hours	Course Objectives	
UNIT I	Respiration-Respiratory pigments and transport of gases. Mechanism of blood clotting. Types of excretory products–Ornithinecycle.Structureofneuron–Conductionofnerve impulse, Mechanism of vision and hearing.								12	CO1	
UNIT II	Fertilization,Cleavage,GastrulationandOrganogenesisoffrog;Placentationinmammals								12	CO2	
UNIT III	Innate and Acquired- Active and Passive;Antigens and Antibodies; Immunologicalorgans–responsesinhumans;Vaccinationschedule								12	CO3	
UNIT IV	HumanGenetics:HumanChromosomes–SexDeterminationinHumans;PatternsofInheritance:AutosomalDominant,AutosomalRecessive,X-linked,Y-linked,Mitochondrial, Multiple Allelic and Polygenic; GeneticCounselling								12	CO4	
UNIT V	AnimalBehaviour:Foraging,CourtshipBehaviour,ShelterandNestConstruction,ParentalCare,LearningBehaviour								12	CO5	
	Total								60		
MappingwithProgrammeOutcomes: CourseOutcomes											
Course Outcomes	Oncompletionofthiscourse,studentswill;										
CO1	Recallthepartsandworkingofbodyorgansanddevelopmentalstages,nametheapatternsofinheritanceandlistdifferenttypesofanimalbehavior									PO1	
CO2	Analysethedifferentdevelopmentalstages									PO1,PO2	
CO3	Analysetheworkingofbodyandimmunesystems									PO4,PO6	
CO4	Analysethedifferentpatternsofinheritance									PO4,PO5,PO6	
CO5	Relatethebehavioursofanimalstophysiology.Analysethedifferenttypesofbehavior									PO3,PO8	
Text Books (Latest Editions)											
1.	VermaP.S.&Agarwal-DevelopmentalBiology,ChordataembryologyS.Chand&Co.										

References Books (Latest editions, and the style as given below must be strictly adhered to)		
1.	Owen,J.A.,Punt,J.&Stranford,S.A.- KubyImmunology.NewYork:W.H.Freeman&Company	
2.	Klug,W.S.,Cummings,M.R.&Spencer,C-ConceptsofGenetics.(12thed.).New Jersey:PearsonEducation	
3.	Mathur,R.-AnimalBehaviour.Meerut:Rastogi.	
4.	VermaP.S.&Agarwal-DevelopmentalBiology,ChordataembryologyS.Chand&Co.	
WebResources		
1.	ContinuousInternalAssessmentTest	
2.	Assignments	
3.	Seminars	
4.	AttendanceandClassParticipation	
5.	EndSemesterExamination	
MethodsofEvaluation		
InternalE valuation	ContinuousInternalAssessmentTest	25 Marks
	Simpledefinitions,MCQ,Recallsteps,Conceptdefinitions	
	MCQ,True/False,Shortessays,Conceptexplanations,Short summaryoroverview	
	Suggestidea/conceptwithexamples,Suggestformulae,Solve problems,Observe,Explain	
S-Strong(3) M-Medium(2) L-Low(1)		

SEMESTER II

Course Code	Course Name	Category	L	T	P	S	Credits	Inst Hours	Marks		
									C I A	External	Total
23BZOAP2	ALLIED ZOOLOGY LAB COURSE II	Allied	Y	-	-	-	2	2	25	75	100
Learning Objectives											
CO1	To identify the different groups of invertebrate animals by observing their external characteristics.										
CO2	To understand the organs, organ system and their functions in lower animals.										
CO3	To get knowledge about the different modes of life and their adaptation based on the environment.										
CO4	To be able to dissect and display the internal organs and mount the mouth parts and scales of invertebrates.										
UNIT		Details							No. of Hours	Course Objectives	
Experiment/Analysis Major		Estimation of Oxygen Consumption by Fish Testing of Blood grouping and Rh factor								CO1	
UNIT II Minor Mounting/slide s/identification analysis		Qualitative analysis of Excretory products Ammonia, Urea, Uric acid								CO2	
UNIT III		Spotters: Frog egg, Blastula, Gastrula, Placenta in mammals Haemophilia, Pedigree chart, Patterns of inheritance: Autosomal dominant, Autosomal recessive, X-linked, Y-linked Mitochondrial. Klinefelter syndrome, Down syndrome, Turner's syndrome, Cri-du chat								CO3	
UNIT IV		Vaccination schedule- WHO								CO4	
UNIT V		Observation Note/Record Note Book									
Course Outcomes											
Course Outcomes	On completion of this course, students will;										
CO1	Identify and label the external features of different groups of invertebrate animals.									PO1	
CO2	Illustrate and examine the circulatory system, nervous system and reproductive system of invertebrate animals.									PO1, PO2	
CO3	Differentiate and compare the structure, function and mode of life of various groups of animals.									PO4, PO6	
CO4	To compare and distinguish the dissected internal organs of lower animals.									PO4, PO5, PO6	
CO5	Prepare and develop the mounting procedure of Economically important invertebrates.									PO3, PO8	
Text Books (Latest Editions)											
1.	Ekambaranatha Iyyar and T.N. Ananthakrishnan, 1995 A manual of Zoology Vol. I (Part I, 2) S. Viswanathan, Chennai										
2.	Ganguly, Sinha and Adhikari, 2011. Biology of Animals: Volume I, New Central Book Agency; 3rd revised edition. 1008pp.										
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4.	Lal, S.S, 2016. Practical Zoology Invertebrate, Rastogi Publications.										
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2.	Barnes, R. D. (1982). <i>Invertebrate Zoology</i> , V Edition. Holt Saunders International Edition.
3.	Barrington, E. J. W. (1979). <i>Invertebrate Structure and Functions</i> . II Edition, E. L. B. S. and Nelson
4.	Boradale, L. A. and Potts, E. A. (1961). <i>Invertebrates: A Manual for the use of Students</i> . Asia Publishing Home.
5.	Lal, S. S. 2005. A text Book of Practical Zoology: Invertebrate, Rastogi, Meerut
Web Resources	
1.	https://nbb.gov.in/
2.	http://www.agshoney.com/training.htm
3.	https://icar.org.in/
4.	http://www.csrtimys.res.in/
5.	http://csb.gov.in/
	https://iinrg.icar.gov.in/
	https://www.nationalgeographic.com/animals/invertebrates/
SCHEME OF EVALUATION	
Estimation of Oxygen Consumption by fish / Finding out the Blood group and Rh factors	20 Marks
Find out the Presence or Absence of Nitrogenous waste products in the sample	10 Marks
Identify Sketch and comment on A, B, C, D & E	15 Marks
Comment on the given Vaccination schedule	10 Marks
Observation Note / Record	20 Marks
Total	75 Marks