

B.Sc. ZOOLOGY

SEM	COURSE CODE	PART	COURSE	COURSE TITLE	Ins. Hrs /Week	CREDIT	MARKS		TOTAL
							CIA	ESE	
I	20U1LT1/LA1/LF1 /LH1/LU1	I	Language – I		6	3	25	75	100
	20UCN1LE1	II	English - I		6	3	25	75	100
	20UZOICC1	III	Core – I	Biology of Invertebrates	5	5	25	75	100
	20UZO1CC2P		Core – II	Practical-I: Biology of Invertebrates	3	2	25	75	100
	20UCH1AC1		Allied –I	Inorganic, Organic and Physical Chemistry - I	5	4	25	75	100
	20UCH1AC2P		Allied –II	Practical – I – Volumetric Estimation	3	2	25	75	100
	20UCN1AE1	IV	AEC-I	Value Education	2	2	-	100	100
			TOTAL		30	21			700
II	20U2LT2/LA2/LF2 /LH2/LU2	I	Language – II		6	3	25	75	100
	20UCN2LE2	II	English – II		6	3	25	75	100
	20UZO2CC3	III	Core – III	Biology of Chordates	6	5	25	75	100
	20UZO2CC4P		Core – IV	Practical-II: Biology of Chordates	3	2	25	75	100
	20UCH1AC3		Allied – III	Inorganic, Organic and Physical Chemistry - II	4	3	25	75	100
	20UCH1AC4P		Allied –IV	Practical – II– Organic Analysis	3	2	25	75	100
	20UCN3SE1	IV	Skill Enhancement Course - I @	Soft Skills Development	2	2	-	100	100
			TOTAL		30	20			700
III	20U3LT3/LA3/LF3 /LH3/LU3	I	Language– III		6	3	25	75	100
	20UCN3LE3	II	English – III		6	3	25	75	100
	20ZO3CC5	III	Core– V	Cell & Molecular Biology	4	4	25	75	100
	20UZO3CC6P		Core– VI	Practical-III: Cell & Molecular Biology	3	2	25	75	100
	20UBO3AC5		Allied– V	Applied Botany I	4	3	25	75	100
	20UBO3AC6P		Allied–VI	Laboratory Course for Applied Botany I	3	2	25	75	100
	20UZO3GE1	IV	Generic Elective I #		2	2	-	100	100
	20UCN2AE2		AEC-II	Environmental Studies	2	2	-	100	100
			TOTAL		30	21			800
IV	20U4LT4/LA4/LF4 /LH4/LU4	I	Language–IV		6	3	25	75	100
	20UCN4LE4	II	English– IV		6	3	25	75	100
	20UZO4CC7	III	Core– VII	Animal Physiology	5	5	25	75	100
	20UZO4CC8P		Core - VIII	Practical-IV: Animal Physiology	3	2	25	75	100
	20UBO4AC7		Allied– VII	Applied Botany II	5	3	25	75	100
	20UBO4AC8P		Allied–VIII	Laboratory Course for Applied Botany II	3	2	25	75	100
	20UZO4GE2	IV	Generic Elective - II#		2	2	-	100	100
	20UCN4EA	V	Extension Activities	NCC, NSS, etc.	-	1	-	-	-
			TOTAL		30	21			700
V	20UZO5CC9	III	Core – IX	Biostatistics, Bioinformatics & Computer Application	6	5	25	75	100
	20UZO5CC10		Core – X	Genetics	5	5	25	75	100
	20UZO5CC11		Core – XI	Microbiology	5	5	25	75	100
	20UZO5CC12		Core - XII	Developmental Biology	5	5	25	75	100
	20UZO5DE1A/BP		DSE – I **		5	4	25	75	100
	20UZO5SE2A/B	IV	Skill Enhancement Course II@		2	2	-	100	100
	20UZO5SE3A/B		Skill Enhancement Course – III @		2	2	-	100	100
	20UZO5EC1		Extra Credit Course - I	General Intelligence for competitive examinations	-	4*	--	100*	100*
			TOTAL		30	28			700
VI	20UZO6CC13	III	Core– XIII	Biochemistry and Biophysics	5	5	25	75	100
	20UZO6CC14		Core– XIV	Immunology	5	5	25	75	100
	20UZO6CC15		Core - XV	Economic Entomology	5	5	25	75	100
	20UZO6CC16		Core - XVI	Environmental Biology and Evolution	5	5	25	75	100
	20UZO6DE2A/BP		DSE II **		5	4	25	75	100
	20UZO6DE3A/B		DSE III **		4	4	25	75	100
	20UCN6AE3	IV	AEC-III	Gender Studies	1	1	-	100	100
	20UZO6EC2		Extra Credit Course - II	Zoology for competitive examinations	-	4*	--	100*	100*
	20UZOAECA		Extra Credit Course for all	Online Course	-	1*	--	-	-
TOTAL					30	29			700
GRAND TOTAL					180	140	-	-	4300

Generic Electives for other major departments

SEM	COURSE CODE	COURSE TITLE
III	20UZO3GE1	Human Health and Hygiene
IV	20UZO4GE2	Vermiculture Technology and Organic Farming

@SKILL ENHANCEMENT COURSE

SEM	COURSE CODE	COURSE TITLE
V	20UZO5SE2A/B	Applied Zoology/Water Pollution Management
V	20UZO5SE3A/B	Poultry Science / Pisciculture

****Discipline Specific Elective**

SEM	COURSE CODE	COURSE TITLE
V	20UZO5DE1A/BP	Practical – V : Biostatistics & Bioinformatics & Computer application, Genetics, Microbiology and Developmental Biology/Instrumentation-1
VI	20UZO6DE2A/BP	Practical – VI: Biochemistry and Biophysics, Immunology, Economic Entomology and Environmental Biology and Evolution / Instrumentation-II
VI	20UZO6DE3A/B	Biotechnology/ Recombinant DNA Technology

Semester – III: ALLIED (Botany)

S.No.	Course	Course Code	Course Title
1.	Allied – I	20UZO3AC5	Animal Diversity and Physiology
2.	Allied – II	20UZO3AC6P	Animal Diversity and Physiology – Practical

Semester – IV: ALLIED (Botany)

S.No.	Course	Course Code	Course Title
1.	Allied – III	20UZO4AC7	Commercial Zoology
2.	Allied – IV	20UZO4AC8P	Commercial Zoology - Practical

Semester	Code	Course	Title of the Course	Hours	Credits	Max. marks	Internal marks	External marks
I	20UZO1CC1	Core – I	BIOLOGY OF INVERTEBRATES	5	5	100	25	75

COURSE OUTCOMES

1. Knowledge on animal taxonomy and biology of protozoans. Ability to classify protozoans.
2. Ability to classify organisms of porifera and coelenterate and knowledge on poriferans and coelenterates
3. Ability to classify organisms of Platyhelminthes and Aschelminthes and knowledge on biology of Platyhelminthes and Aschelminthes
4. Ability to classify organisms of Annelida and Arthropoda and knowledge on biology of Annelids and Arthropods
5. Ability to classify organisms of Mollusca and Echinodermata and knowledge on biology of Molluscs and Echinoderms

UNIT I TAXONOMY & PROTOZOA

15 hours

Principles and methods of taxonomy: Concepts of species and hierarchical taxa, biological nomenclature, classical and quantitative methods of animal taxonomy.

General characters and classification of protozoa up to classes

Type study: *Paramecium* - general organization, nutrition, and reproduction.

General topics: Plasmodium life cycle Protozoan diseases in Man; Malaria, Leishmaniasis # Trichomoniasis, and Amoebiasis. #

UNIT II PORIFERA&COELENTERATA

15 hours

General characters and classification up to classes.

Type study: *Sycon*- general organization, and reproduction.

Type study: *Obelia*-structure of *Obelia* colony, structure of Medusa, and reproduction.

General topics: Canal system in Sponges, Corals and # coral types # and Coral Reefs. Polymorphism in coelenterates

UNIT III PLATYHELMINTHES & ASCHELMINTHES

15 hours

General characters and outline classification up to classes.

Type study: Liver fluke (*Fasciola*)-Morphology, excretory, reproductive system and lifecycle.

Type study: *Ascaris*- Morphology, excretory, and reproductive system.

General topics: Helminth parasites in Man # parasitic adaptation in man #.

UNIT IV ANNELIDA & ARTHROPODA

15 hours

General characters and classification up to classes.

Type study: Earthworm-Morphology, digestive, excretory and reproductive systems.

Type study: Fresh water Prawn (*Palaemon*): morphology, digestive, excretory and reproductive systems.

General topics: Larval Forms in Crustacea, Mouth parts in Insects. # Peripatus general account #

General characters and classification up to classes.

Type study: Snail (*Pila*) – Morphology, Digestive, Respiratory, Excretory, and Reproductive systems.

Type study: Starfish, morphology, Water vascular system.

General topics: # Economic importance of Molluscs, and Echinoderms #. Larval forms of Echinoderms.

Minor phyla: general account on Rotifera and Ectoprocta

#.....# Self-study portion

Text Book:

1. Kotpal, R.L. Invertebrates, Rastogi Publication, Meerut. 11th Edition, 2017.

UNIT I : Pages 1-37, 129-147, 158 – 172, 85 -93, 100 -114, 50 -67, and 192 - 197

UNIT II : Pages. 247 – 254, 225 -233, 335 -349, 295- 310, 255, 350, and 356

UNIT III : Pages 417- 429, 467 - 475, 379 – 397, 436 – 455, 411, 451, and 469

UNIT IV : Pages 558 -570, 503 – 532, 732 – 762, 591 -628, 763, and 767, 803 -808.

UNIT V : Pages 871 – 884, 809 – 832, 926 -936, 907 -925, 901, and 937.

Books for Reference:

1. Jordan, E.L. and Verma. P. S. Invertebrate Zoology, S. Chand & Co. 3rd Edition, 2007.
2. Ekambaranatha Ayyar, Outlines of Zoology. Vols. I & II S. Viswanathan (Printers & Publishers) Pvt. Ltd., Chennai. 1993.

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code		Title of the Paper			Hours		Credits		
I	20UZO1CC1		BIOLOGY OF INVERTEBRATES			5		5		
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO2	✓	✓	-	✓	✓	✓	✓	-	-	✓
CO3	✓	✓	-	✓	✓	✓	✓	-	-	✓
CO4	✓	✓	-	✓	✓	✓	✓	-	-	✓
CO5	✓	✓	-	✓	✓	✓	✓	-	-	✓
Number of Matches= 38, Relationship : HIGH										

Prepared By:
SS

Checked by:
Dr. I. Joseph A. Jerald

Semester	Code	Course	Title of the Course	Hours	Credits	Max. marks	Internal marks	External marks
I	20UZO1CC2P	Core – II	PRACTICAL - I BIOLOGY OF INVERTEBRATES	3	2	100	25	75

Course Outcomes

1. Understand the different functional systems of Cockroach, Silk moth through dissection.
2. Identify and prepare the slides of various invertebrate species to study their structures
3. Classify providing reasonable features for the taxonomy, draw labelled sketches along with their biological significance.
4. Relate the structure and functions of selected invertebrates
5. Culture few livelihood forms; make a thorough study on given ecosystem.

Laboratory principles, Safety measures and practices.

I. Major Practicals:

Cockroach / Silk moth-Nervous, Digestive and Reproductive systems

Prawn – Nervous system

II. Minor Practicals:

Identification of Mosquitoes (3 different genus)

Earthworm - Body setae&Penial setae

Mouth parts -Honey Bee, Housefly, Mosquito, and Cockroach.

Prawn - appendages

III. Spotters:

a) Classify giving reasons:

Entamoeba, Paramecium, Euglena, Sycon, Hydra, Obelia, Aurelia, Sea anemone, Planaria, Taenia, Ascaris, Nereis, Palaemon, Penaeus, Crab, Spider, Butterfly, Rhinoceros beetle, Pila, Freshwater mussel, Octopus, Chiton, Dentalium, Sepia, Starfish, Sea urchin and Sea cucumber.

b) Draw Labelled Sketch:

T.S. of Taenia, T.S. of Fasciola, Ephyra larva, Nauplius larva, Zoea larva

c) Biological Significance:

Sponge – Gemmule, Physalia, Leech, Peripatus, Limulus, Bipinnaria,

d) Relate structure and function:

Taenia – Scolex, Nereis – Parapodium, Penaeus – Petasma, Star fish – Tube feet and Pedicellariae, Earthworm - Body setae and Penial setae.

IV Record

A record of lab work shall be maintained and submitted at the time of Practical examination for valuation.

V Group Project:

Culture of Brine shrimp/ Drosophila/ Chironomous/ Plankton

VI Field study:

Visit to any ecological park and submission of report with photographs

TEXT BOOK

1. Allaby, M. (Ed.). Oxford Dictionary of Zoology. Oxford University Press, Oxford, 1999.
2. Meglitsch, P.A. and Schram, F.R.. Invertebrate zoology (Third Edition). Oxford University Press, New York. 1991.

REFERENCE

1. Brusca&Brusca. Invertebrates, Second Edition. Sinauer Assoc., Inc. Sunderland, MASS, USA.2003.
2. Pearse&Buchsbaum,. Living Invertebrates. The Boxwood Press. Pacific Grove, CA, USA.1987.
3. Pechenik,. Biology of the Invertebrates, Seventh Edition. McGraw Hill Education, New York, NY, USA. 2015.

WEB REFERENCE

1. <http://www.itis.usda.gov/itis/status.html>
2. <http://www.bishop.hawaii.org/bishop/HBS/hbs1.html>

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code		Title of the Paper				Hours		Credits	
I	20UZO1CC2P		PRACTICAL - I BIOLOGY OF INVERTEBRATES				3		2	
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✓	✓	✓		✓	✓	✓		✓	
CO2	✓		✓	✓	✓	✓		✓	✓	
CO3	✓	✓	✓		✓		✓			✓
CO4	✓	✓		✓	✓		✓	✓		✓
CO5		✓	✓	✓	✓	✓		✓	✓	✓
Number of Matches= 35, Relationship : HIGH										

Prepared By:
Dr. M. Salahudeen

Checked by:
Dr. I. Joseph A. Jerald

Semester	Code	Course	Title of the Course	Hours	Credits	Max. marks	Internal marks	External marks
II	20UZO2CC3	Core – III	BIOLOGY OF CHORDATES	6	5	100	25	75

Course Outcomes

1. Understand the general and specific characteristics of the different classes and organization of Chordates
2. Describe the general characters of Amphibians and relate them to their lifestyle.
3. Understand the taxonomy and morphology of reptiles with reference to snakes in South India.
4. Classify Aves and provide knowledge on the biology and adaptations of Birds.
5. Discuss the mammalian features with systems and significant adaptations.

Unit – 1: PROTOCHORDATES and PISCES

18 hours

General characters and outline classification.

Type study: Amphioxus – Digestive, excretory and reproductive systems.

Type study: Scoliodon - External characters, Digestive, Respiratory, #Circulatory#, Nervous and Urinogenital systems

General Topic: Fish migration, Accessory respiratory organs in Fish, Fins and Scales of Fishes

UNIT - II: AMPHIBIA

18 hours

General characters and outline classification.

Type study: Frog - External characters, Digestive, Respiratory, Circulatory, #Nervous#andUrinogenital systems

General Topic: Parental care in Amphibians, Neoteny and Paedogenesis.

UNIT - III: REPTILIA:

18 hours

General characters and outline classification:-

Type study: Calotes - External characters, Digestive, Respiratory, Circulatory, #Nervous#andurinogenital systems.

General Topic: Snakes of India; Identification ofPoisonous and Non-poisonous snakes. Evolutionary significance of Archaeopteryx.

UNIT - IV: AVES:

18 hours

General characters and outline classification:-

Type study: Pigeon - External Characters, Digestive, #Respiratory#, Circulatory and Urinogenital systems.

General Topic: Flightless Birds, Flight adaptation and Migration in Birds, Beak and Feet in Aves.

UNIT - V: MAMMALIA:

18 hours

General characters and outline classification:-

Type study: Rabbit - External characters, Digestive, Respiratory, #Circulatory#, Nervous and Urinogenital systems.

General Topic: Dentition in Mammals, Adaptations of Aquatic Mammals.

#.....# Self study portion

Text Books:

1. EkambaranathaAyyar.M&Ananthakrishnan.T.N., A Manual of Zoology Vol.II- Part I & II., S.VishwanathanPvt.Ltd, Chennai, 2010.

UNIT I : SECTION I :Pg 76-99& SECTION II :158-190

UNIT II : SECTION II : Pg. 289-308

UNIT III : SECTION III : Pg. 335-344, 355-373.

UNIT IV : SECTION IV : Pg. 381-426, 427-471.

UNIT V : SECTION V : Pg. 544-571, 588.

Books for Reference:

1. Kotpal, R.L. Modern text book of Zoology - VERTEBRATA, 4th Edition, Rastogi Publication, Meerut., 2017-2018.
2. Jordan, E.L. & Verma, P.S. Chordate Zoology. New Delhi: S. Chand. (2013).
3. Springer, J.T. & Holley, D. An Introduction to Zoology: Investigating the Animal World. Massachusetts. Jones & Bartlett Learning (2013).
4. Young, J.Z. Life of Vertebrates. Clarendon Press Oxford, (1950).

Web reference:

1. www.earthlife.net
2. www.iaszoology.com
3. www.sanctuaryasia.com
4. www.oercommons.org

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code		Title of the Paper			Hours		Credits		
II	20UZO2CC3		BIOLOGY OF CHORDATES			6		5		
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✓	✓	✓		✓	✓	✓		✓	
CO2	✓		✓	✓	✓	✓		✓	✓	
CO3	✓	✓	✓		✓		✓			✓
CO4	✓	✓		✓	✓		✓	✓		✓
CO5		✓	✓	✓	✓	✓		✓	✓	✓
Number of Matches= 35, Relationship : HIGH										

Prepared By:
Dr. M. Salahudeen

Checked by:
Dr. I. Joseph A. Jerald

Semester	Code	Course	Title of the Course	Hours	Credits	Max. marks	Internal marks	External marks
II	20UZO2CC4P	Core – IV	PRACTICAL - IIBIOLOGY OF CHORDATES	3	2	100	25	75

Course Outcomes:

1. Understand different functional system of Frog through virtual laboratory techniques.
2. Evaluate and know the patterns of the Contours of the scales of in different fishes; and describe the types of Feathers in birds.
3. Classify providing meaning full reason for its taxonomy; Draw label, sketches along with their biological significance.
4. Relate the structure and function of a fish, bird and mammals.
5. Express that has been observed in the ecosystem and produce a report.

I. Major Practicals:

Virtual laboratory technique: Arterial system, Venous system, Digestive system and Reproductive system of Frog.

Demonstration Dissection: Digestive system, Nervous system and Reproductive system of Fish.

II. Minor Practicals:

Mounting: Placoid, Ctenoid, Cycloid scales

Gill of fish, Fins of fish, Quill feather

III. Spotters:

a) Classify giving reasons:

Balanoglossus, Ascidia, Amphioxus, Anabas, Tilapia, Eel, Exocoetis, Echinoid, Ichthyophis, Rhacophorus, Ambystoma, Hemidactylus, Viper, Cobra, Duck, Eagle, Owl, Bat, Loris.

b) Draw Labelled Sketches:

T.S of Amphioxus, Poison apparatus: Snake

Frog - Pectoral girdle, Pigeon - Pelvic girdle

c) Biological Significance:

Ascidian tadpole larva, Ichthyophis, Chameleon, Exocoetis – flying fish

d) Relate structure and function

Rabbit - Dentition, Synsacrum in Bird, Echinoid- Sucker

IV Group Project

Visit to any biodiversity centre / spots and submission of report.

V Record Note

* A record of lab work shall be maintained and submitted at the time of Practical Examination for valuation.

REFERENCES

1. Evolution of Chordate structure – an introduction to comparative anatomy by Hobart M. Smith
2. Modern Text Book of Zoology :Vertebrates by R.L. Kotpal
3. Hyman's Comparative Vertebrate Anatomy by Marvalee H. Wake

TEXT BOOK

1. Text Book of Vertebrate Zoology by J. S. Kingsley
2. Textbook of Vertebrate Zoology by Prasad S
3. Modern text book of Zoology Vertebrates by R.L. Kotpal

Web Reference

1. https://en.wikipedia.org/wiki/Evolutionary_radiation
2. <https://books.google.co.in/books?id=tEhO->

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code		Title of the Paper			Hours		Credits		
II	20UZO2CC4P		PRACTICAL - II BIOLOGY OF CHORDATES			3		2		
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	√		√	√	√	√	√	√	√	√
CO2	√		√	√	√	√	√		√	√
CO3		√	√	√	√	√			√	√
CO4	√	√	√	√	√	√			√	√
CO5		√	√	√	√	√	√	√		√
Number of Matches= 36, Relationship : HIGH										

Prepared by:

1. Dr P.RAJASEKAR

Checked by:

1. Dr I.JOSEPH A. JERALD