

YADAVA COLLEGE

(An Autonomous Co-Educational Institution)
Re-accredited with "A" Grade by NAAC
(Affiliated to Madurai Kamaraj University)
Govindarajan Campus, Thiruppalai, Madurai – 625014.



PG & RESEARCH DEPARTMENT OF ZOOLOGY

BOARD OF STUDIES MEETING

06 AUGUST 2022

B.Sc. Zoology Programme

2022- 2023 onwards

DEPARTMENT OF ZOOLOGY

B.Sc. ZOOLOGY

COURSE CONTENT

Semester	Sub. Code	Title of the Paper	Teaching Hrs / Week	Credits	Evaluation			Examination Hours
					Internal	External	Total	
I		Paper I – Tamil	6	3	25	75	100	3
		Paper I – English	6	3	25	75	100	3
		Paper I – Invertebrate	8	6	25	75	100	3
		Paper II – Lab in Invertebrate-I	2	1	40	60	100	3
		Paper I – General Chemistry	2	4	25	75	100	3
		Lab in Ancillary Chemistry-I	2	1	40	60	100	3
		Environmental Science	2	2	25	75	100	3
		Communicative English – I	2	2	25	75	100	3
		TOTAL	30	22				
II		Paper II – Tamil	6	3	25	75	100	3
		Paper II – English	6	3	25	75	100	3
		Paper III – Chordata	8	6	25	75	100	3
		Paper IV – Lab in Chordata- II	2	1	40	60	100	3
		Paper II – General Chemistry	2	4	25	75	100	3
		Lab in Ancillary Chemistry-II	2	1	40	60	100	3
		Value Education	2	2	25	75	100	3
		Communicative English – II	2	2	25	75	100	3
		TOTAL	30	22				

YADAVA COLLEGE

PG & RESEARCH DEPARTMENT OF ZOOLOGY

B.Sc., ZOOLOGY

Vision:

- The Department creates and promotes the discovery and broad spectrum of knowledge about the biology of animals, Genetics, Immunology, Microbiology, Evolution and their environments.
- The holistic environment of the students able to make them a good Human beings effectively for their welfare and society in this dynamic era.

Mission:

- To provide quality education and research in the area of Zoology in Life science.
- To provide the holistic set of courses in biological science that ameliorates the understanding, depth of knowledge and technical capability of the students.
- To bring about an awareness regarding nature and biodiversity and help to solve different problems to establish sound and peaceful environment and life for community and society.

B.Sc., PROGRAMME OUTCOMES:

PO1- This Programme offers theoretical as well as practical knowledge about different subject areas of life sciences.

PO2- This programme develops the curiosity of environment to the students

PO3- This programme is most beneficial for students who have a strong interest and background in zoology.

PO4- It is also advantageous for students who wish to pursue multi & Inter- disciplinary science courses in future.

PO5- It develops a self employed culture among the students and it makes the learner a successful Entrepreneur.

PROGRAMME SPECIAL OUTCOMES:

PSO1- Acquire the knowledge on the diversity of animals in relation to their Phyla and its classification and get to identify the animals.

PSO2- Identify the structural and functional properties of cells and tissue and give a basic understanding the development of an animal.

PSO3- Understand the metabolic pathways of biomolecules and acquire the knowledge in the quantitative and the qualitative estimation of biomolecules.

PSO4- Impart the theoretical and practical knowledge on various techniques of biotechnology and their application in industries.

PSO5-Comprehend the genetic inheritance and the influence of alleles and non-alleles on the normal phenotypic expression of genes. Attain the knowledge on the key concepts involved in the creation of a new animal species.

PSO6- Attain the depth information on the biology of microorganisms, their impacts on human welfare and applied the gained information in industrial productions and imparts in depth knowledge of tissues, cells and molecules involved in host defense mechanism.

PSO7- Gain the knowledge on detailed concepts of digestion, respiration, excretion, the functioning of nerves and muscles.

PSO8- Elaborate on Data processing and Data Analysis and differentiate between the qualitative and quantitative research and understand the different types of Research design.

PAPER - I
INVERTEBRATA

Semester: I

Hours / Week: 8

Subject Code: P3CZY4

Credit: 6

Objectives

Invertebrata is a fundamental course to provide basic understanding of Biology of Invertebrates. This paper deals with classification and diagnostic characteristics of Phylum Invertebrata. It also deals with the comparative anatomy and organization of various Invertebrates.

UNIT I

A brief introduction to principles of taxonomy and nomenclature – Level's of Organization in animals.

Phylum Protozoa: General characters, Classification up to class level with examples. Type study-Paramecium-Structure and Reproduction - conjugation only.

General Topics: Nutrition in Protozoa. Life cycle and pathogenicity of Plasmodium, *Entamoeba* and *Trypanosoma*. Locomotion in Protozoa.

Outcomes:

- Outline the taxonomical classification of Invertebrates
- Analyze the structural, functional organization & importance of Invertebrates
- Imparts the Nutrition, Locomotion & life cycle of Protozoa

UNIT II

Phylum Porifera: General characters, Classification up to class level with examples. Type study - Sycon - Cellular structure, spicules in sponges- A brief study.

Phylum Coelenterata: General characters, Classification up to class level with examples.

Type study- *Obelia* - Structure & **Life cycle**.

General Topics: Canal system in Sponges, Polymorphism in Coelenterates, Coral and Coral reef formation.

Outcomes:

- Outline the classification of Porifera & Coelenterate
- Obtain in depth knowledge on *Sycon* & *Obelia*
- Enlight the information and importance regarding corals

UNIT III

Phylum Helminthes: General Characters, Classification up to class level with examples. Type study - Liver fluke. Nematelminthes – Ascaris life cycle.

Pathogenic effects of - *Ancylostoma duodenale*, *Wuchereria bancrofti* and their control measures.

Phylum Annelida: General characters, Classification up to class level with examples.

Type study – Earthworm - External morphology, Excretion and Reproduction.

General Topics: Parasitic adaptation in Helminthes, Metamerism in annelida.

Outcomes:

- Apply the knowledge & understanding on Phylum Helminthes & Annelids
- Imparts the External Anatomy of Liver fluke & Earthworm

UNIT IV

Phylum Arthropoda: General characters, Classification up to class level with examples. Type Study - *Penaeus*.

Phylum Mollusca: General characters, Classification up to class level with examples.

Type study – Fresh water mussel.

General Topics: Peripatus- Structure and affinities, Social life in Insects (**Honey Bee**). Torsion in Gastropoda- **Cephalization, Larval forms of Crustacea (Zoea and Mysis)**

Outcomes:

- Understand the fundamental classification of Phylum Arthropods & Mollusca
- Gain the Knowledge & Understanding of *Penaeus* & Fresh water mussel
- Recognize the affinities between Arthropods & Annelids

UNIT V

Phylum Echinodermata: General characters, Classification up to class level with examples. Type study- Starfish (*Asterias rubens*)- Morphology and Water vascular system.

General Topic: Larval forms of Echinoderms, Water vascular system in Echinodermata.

Outcomes:

- Acquire knowledge on the classification of Echinodermata upto class level
- Illustrate the larval forms & Water vascular system of Echinodermata

Teaching Pedagogy:

- OHP, Powerpoint Presentation, Chalk and talk and **Demonstration with Model**.

Textbook

1. L. Kotpal (2020). Modern text book of Zoology- Invertebrates. Rastogi publication, Meerut.
2. E.L. Jordon and P.S. Verma (2005). Invertebrate Zoology –S.Chand & Co. New Delhi
3. Ekambaranatha Iyer and T.N.Ananthkrishnan (2003). A Manual of Zoology, Volume 1. Viswanathan Publications, Chennai.

Reference Books:

1. N. Arumugam, N. C. Nair and S. Leelavathi (2014). Text book of Invertebrates. Saras Publications. Nagercoil.
2. P.S. Dhami and J.K. Dhami (2006). Invertebrate Zoology –R.Chand & Co.
 - a. New Delhi.
3. R.L.Kotpal, (2005). Invertebrate Zoology. Rastogi Publications, Meerat.
4. R. L. Kotpal (2020). Modern text book of Zoology- Invertebrates. Rastogi publication, Meerut.

E-Resources:

- Principles of Taxonomy and Classification: <https://www.youtube.com/watch?v=vFgZ6dpXLcE>
- Porifera and Colenterata: https://www.youtube.com/watch?v=ScW_GgyE34I
- Helminthes and Annelids: https://www.youtube.com/watch?v=pZdz05_aH1o
- Arthropoda: <https://www.youtube.com/watch?v=2An7rV8JSIA>
- Echinodermata: <https://www.youtube.com/watch?v=P0oRWMUn87I>

PAPER - II
LAB IN INVERTEBRATA

Semester : I

Hours/Week : 2

Subject Code :P3CZYL3

Credit : 1

Course Outcomes:

- Observe the Digestive, Reproductive and Nervous system of cockroach through web resources.
- Identify the mouth parts of Cockroach, Honey bee, and Housefly.
- Differentiate the appendages of prawn.
- Mount the body setae and penial setae of earthworm.
- Know the characters of some typical spotters in Invertebrate animal.

I. MAJOR PRACTICAL

CD/Model/Chart-Anatomical observation and comment on digestive, reproductive and nervous system of Cockroach.

Web resources - <http://www.neosci.com>; <http://www.scienceclass.com>

II. MINOR PRACTICAL

Slides/Model/Chart – Identification (draw and label)

- 1.Cockroach: Mouthparts.
- 2.Earthworm: Penial setae/ body setae.
- 3.Honey bee, House fly and Mosquito -Mouthparts.
- 4.Prawn -Appendages

III. SPOTTERS

Protozoa: Amoeba, Paramecium- Entire, Binary fission, Conjugation, Euglena and Ceratium

Porifera: Spicules and Gemmules

Coelentrata: Obelia colony, Medusa of *Obelia* and *Physalia*

Platyhelminthes: Liver fluke, Larval forms of liver fluke and *Taenia solium*.

Nematoda: Ascaris- Male &female.

Annelida: Nereis, Leech

Arthropoda: Prawn, Nauplius, Zoea, Mysis, Centipede, Millipede and Scorpion,
Beneficial insects- Honey bee and Silk worm. Any two harmful insects.

Mollusca: Pila, Unio, Solen, Chiton, Dentalium, Nautilus and Octopus

Echinodermata: Star fish, Sea urchin and Sea cucumber, Echinoderm Larva –
Bipinnaria larva.

➤ A field visit for identification of species.

Reference Books:

1. S. S. Lal (2010). Invertebrate Practical Zoology. Rastogi Publications, Meerut.
2. Jayasurya, Prasannakumar and N. Arumugam (2013). Practical Zoology (Volume I). Saras Publication, Nagercoil.

E-Resources:

- Helminthes and Annelids: https://www.youtube.com/watch?v=pZdz05_aH1o
- Arthropoda: <https://www.youtube.com/watch?v=2An7rV8JSIA>
- Echinodermata: <https://www.youtube.com/watch?v=P0oRWMUn87I>

PAPER - III
CHORDATA

Semester: II

Hours / Week: 8

Subject Code:Q3CZY5

Credit : 6

Objectives

Chordata is a fundamental course to provide basic understanding of biology of Chordates. This paper deals with classification and diagnostic characteristics of Phylum Chordata

Unit-I: Introduction and Prochordates

General characters of Chordates, Outline classification of chordates (in brief). Prochordates - General characters, Classification up to sub phylum level with examples. Type study—Amphioxus.

General Topic: Retrogressive metamorphosis in Ascidian; Affinities of Hemichordates.

Outcomes:

- Outline and classification of Prochordates and chordates
- Explain the characteristics features of Amphioxus

Unit-II: Pisces and Amphibia

Pisces –General characters of Pisces, Classification up to sub class level with examples, Type study – Shark: digestive, circulatory and nervous System.

Amphibia – General characters of Amphibians, classification up to subclass level with examples.

Type study- Frog: external morphology, respiratory system and urinogenital system.

General Topic: Parental care in Amphibia; Migration of fishes; Accessory respiratory organ in fishes; Neotany in Amphibia.

Outcomes:

- Explain the characteristics of Agnatha and Pisces.
- Assess the adaptations and evolutionary importance of Amphibia
- Emphasize the significance of Parental care and migration

Unit- III: Reptilia

General characters of Reptiles, Classification up to subclass level with examples.

Type study – Calotes: external morphology, circulatory system, urinogenital system and nervous system.

General Topic: identification of Poisonous and non-poisonous snakes- Poison apparatus and biting mechanism, first aid; **Mesozoic Reptiles (Tyrannosaurus, Ornitholestes)**

Outcomes:

- Gain the depth knowledge on classification of Reptiles
- Differentiate poisonous & Non-poisonous Snakes
- Making awareness on snake bite and first aid

Unit-IV: Aves

General characters of Aves, classification up to subclass level with examples.

Type study – Pigeon- external morphology, circulatory system and reproductive system.

General Topics: Flight adaptation and migration of birds - flightless birds.

Outcomes:

- Emphasize the external morphology of Aves with examples.
- Understand the migration & flight adaptation of Birds

Unit-V: Mammalia

General characters of mammals, Classification up to subclass level with examples.

Type study: Rabbit - external morphology, digestive system, nervous system and reproductive system, circulatory System.

General Topics: Egg laying mammals, Dentition in mammals and Aquatic mammals and its adaptations (Dugong).

Outcomes:

- Characterize the different system of Mammals
- Analyze the dentition in Mammals

Teaching Pedagogy:

- OHP, Powerpoint Presentation, Chalk and talk, You Tube Videos and Demonstration with model.

Textbook:

1. R.L.Kotpal, (2005). Vertebrate Zoology. Rastogi Publications, Meerat.
2. Ekambaranatha Iyer and T.N.Ananthakrishnan (2003). A Manual of Zoology-Chordate (Volume II).Viswanathan Publications, Chennai.

Reference Books:

1. N. Arumugam, N. C. Nair and S. Leelavathi (2014). Text book of Chordates. Saras Publications, Nagercoil.
2. E.L. Jordon and P.S. Verma (2006). Chordate Zoology –S.Chand & Co. New Delhi.
3. P.S. Dhami and J.K. Dhami (2006). Chordate Zoology –R.Chand & Co. New Delhi.

E-Resources:

- Classification of Chordates: <https://www.youtube.com/watch?v=yT5iR32Sq90>
- Characteristics of Amphibia: <https://a-z-animals.com/animals/amphibians/>
- Characteristics of Pisces: <https://www.youtube.com/watch?v=Aoe2-zuCfsc>
- Flight Adaptation of Birds: <https://www.youtube.com/watch?v=TZHW2RVJquE>
- Classification of Mammals: https://www.youtube.com/watch?v=fm57_wolhKM

PAPER - IV

LAB IN CHORDATA

Semester: II

Hours/Week : 2

Subject Code:Q3CZYL5

Credit : 1

Course Outcomes:

- Observe the digestive, urinogenital and nervous system of frog through web sources
- Mount the placoid scale, **ctenoid scale and cycloid scale** of shark.
- Label the different parts of brain, fore limb and hind limb of frog.
- Know the characters of some typical spotters in chordate animal.
- Observe the animal structures of chordates

I. Major Practical

Virtual/Dissection-Anatomical observation and Description on digestive system and urinogenital system of Frog.

II. Minor Practical

Mounting

Slides/Model/Chart – Identification (Draw and label)

1. Shark: Placoid Scale, **ctenoid scale and cycloid scale**
2. Dissection and observation of visceral organs of fish- (Demonstration only)

III. Spotters

Prochordata: Amphioxus entire, Balanoglossus and **Ascidian**

Pisces: Echeneis, Hippocampus, Eel, *Labio rhogita* and *Tilapia*.

Amphibia: Bufo, Rhacophorus and Axolotl larva.

Reptelia: Any two Poisonous and Non Poisonous snakes and Draco.

Birds: Any three local birds (Beaks and claws modifications).

Mammals: Bat, Kangaroo, Kiwi and **Marine Mammals (Whale and Dugong)**

Osteology: Skull, Pectoral girdle & Pelvic girdle of **Pigeon and Rabbit/ Frog.**

Reference:

1. S. S. Lal (2010). Vertebrate Practical Zoology. Rastogi Publications, Meerut.
2. Jayasurya, Prasannakumar and N. Arumugam (2013). Practical Zoology (Volume I). Saras Publication. Nagercoil.

E-Resources:

- Characteristics of Amphibia: <https://a-z-animals.com/animals/amphibians/>
- Characteristics of Pisces: <https://www.youtube.com/watch?v=Aoe2-zuCfsc>
- Reptiles: <https://www.doubtnut.com/question-answer-biology/name-two-poisonous-and-non-poisonous-snakes-found-in-south-india-644426925>

- BIOLAB Series – Realistic lab activities – Anatomy & physiology of the frog, Carolina Biological Supply company, Leicester, UK, 2007.
- The Digital Frog 2.5 – CDROM for Window and Mac version 2.5a, Digital frog International Leicester, UK, 2007. (www: digitalfrog.com)