Sadakathullah Appa College

(Autonomous)

(Reaccredited by NAAC at an'A' Grade. An ISO 9001:2015 Certified Institution)

Rahmath Nagar, Tirunelveli- 11.
Tamil Nadu.

DEPARTMENT OF ZOOLOGY

MY LORD
VOUCHSAFE ME WISDOM

CBCS SYLLABUS
For
B.Sc. Zoology

(Applicable for students admitted in June 2021 and onwards)

CBCS Syllabus – B.Sc. Zoology

(2021-22 onwards)

SEM	Part	P	Title of the paper	S. Code	H/W	L*	T*	P*	C	Marks		
										I	E	T
I	I	I L-I	இக்காலத்தமிழ்	21ULTA11	6				3			
			Grammar and Translation - I	21ULAR11								
	II	II L-I	Communicative English -I	21ULEN11	6				3			
	III	DSC-I	Animal Diversity-I	21UCZO11	4				4			
	III	DSC-II	Animal Diversity-II	21UCZO12	4				4			
	III	P-I	Animal Diversity-I& Animal Diversity-II Practicals	21UCZO1P1	2				1			
	III	A-I/1	Food Science	21UAAN11	4				3			
	III	A-I/1P	Food Science Practicals	21UAAN1P1	2				1			
	IV	AECC-I	Value Education-I	21USVE1A	2				2			
			Value Education-II	21USVE1B								

Department of ZOOLOGY
Programme : B.Sc.
Programme Learning Outcomes

PLO	Upon completion of B.Sc. Degree Programmes, the graduates will be able to:
PLO 1	**Disciplinary Knowledge** Acquire scientific knowledge and the understanding of major concepts and theoretical principles.
PLO 2	**Creative Thinking and Practical Skills / Problem Solving Skills** Enrich skills of observation / research related skills to draw logical inferences from scientific experiments/ programming and skills of creative thinking to develop novel ideas. Hone problem solving skills in theoretical, experimental and computational areas and to apply them in real life situations.
PLO 3	**Sense of inquiry and Skilled Communicator** Develop the capability for raising appropriate questions relating to the current/emerging issues encountered in the scientific field and to plan, execute and express the results of experiments / investigations through technical writings as well as through oral presentations.
PLO 4	**Ethical Awareness / Team Work / Environmental Conservation and Sustainability** Equip them for conducting work as an individual / as a member, or as a leader in diverse teams upholding values such as honesty and precision and thus preventing unethical behaviours such as fabrication, falsification, misrepresentation of data, plagiarism etc. to ensure academic integrity. Realise that environment and humans are dependent on one another and to know about the responsible management of our ecosystem for survival, and for the well-being of the future generation as well.
PLO 5	**Usage of ICT/ Lifelong Learning / Self-Directed Learning** Inculcate the habit of learning continuously through the effective adoption of ICT to update knowledge in the emerging areas in Sciences for inventions/discoveries and also to engage in remote / independent learning.

Programme Specific Outcomes

PSO No.	Upon completion of B.Sc. ZOOLOGY Degree Programme, the students will be able to :	PLOs Mapped
PSO-1	Understand the fundamental principles of Zoology which include animal diversity with animal classification, taxonomy and their diagnostic characteristics.	1
PSO-2	Apply the knowledge to understand the protection and restoration of biological diversity, ecological integrity, health, conservation, management of wildlife and their gene bank.	1,4
PSO-3	Collect, record, analyze and interpret data using appropriate ecological, genetic, and physiological techniques adopted in vivo and in vitro and to express them effectively through written and oral presentations using ICT.	1,3,4,5
PSO-4	Analyse the principles, animal development, physiology, genetics animals, their evolution, and to compare the structure of Prokaryotes and Eukaryotes	1,4
PSO-5	Develop creative, practical and problem solving skills to pursue research and gain placements in the fields of Biochemistry, Microbiology, Sericulture, Aquaculture, Apiculture and Biotechnology.	1,2

Semester – I

Course Title	**ANIMAL DIVERSITY - I**
Total Hrs	**60**
Hrs/Week	**4**
Sub.Code	**21UCZO11**
Course Type	**THEORY**
Credits	**4**
Marks	**100**

General Objective:

To understand Morphology, Taxonomy and general characters of Invertebrates

Course Objectives: The learners will be able to:

CO No.	Course Objectives
CO-1	List the characters and classification of Phylum Protozoa
CO-2	Describe the life history of Porifera and Coelenterata
CO-3	Interpret the pathogenesis of Platyhelminthes and Aschelminthes
CO-4	Distinguish the characters of Annelids and Arthropods
CO-5	Justify the economic importance of Mollusca

UNIT I

Introduction to Principles of Taxonomy (Binomial nomenclature), Types of classification-Natural, Artificial, Practical.

Protozoa: General characters and classification upto classes with examples.

Type study: Paramecium - Morphology – Nutrition – Locomotion – Reproduction - (Binary fission & Conjugation).

General topic: General structure, life cycle, pathogenicity and control measures of *Entamoeba histolytica*,*Plasmodium malariae*.

UNIT II

Porifera: General characters and classification upto classes with examples

Type study: Scypha (Sycon) - External characters and life history.

General topic: Canal system in sponges.

Coelenterata: General characters and classification upto classes withexamples.

Type study: *Obelia geniculata*- External characters and life history.

General topic: Coral formation and types of coral reefs**.**

UNIT III

Platyhelminthes: General characters and classification upto classes with example.

General topic *: Taenia solium* –External morphology, life cycle, pathogenicity and control measures.

Aschelminthes: General characters and classification upto classes with example

General topic: External morphology,life cycle, pathogenicity and control measures of *Ascaris lumbricoides.*

UNIT IV

Annelida: General characters and classification upto classes with examples.

Type study: Earthworm – external morphology and reproduction.

General topic: Metamerism in Annelids,

Arthropoda: General characters and classification upto classes with an example.

Type study: Cockroach- Morphology and nervous system.

General topic: 1.Economic Importance of Honey Bee. 2. Peripatus and its affinities

UNIT V

Mollusca: General characters and classification upto classes with examples.

Type study:*Pila globosa* -External characters and life history.

General topic: Economic importance of Molluscs. (Oyster and Mussels)

Echinodermata: General characters and classification upto classes with examples.

Type study: Star fish - External characters and water vascular system only.

General topic: Larval forms of Echinodermata**.**

TEXT BOOKS

1. Jordon. E.L.and Verma. P. S. 1963 Invertebrate Zoology - S.Chand Publishers.
2. Kotpal, R. L. 2019. Modern Text Book of Zoology – Invertebrates, Rastogi Publications.

REFERENCE BOOKS - INVERTEBRATA

1. Arora, M. P. 2006. Non – chordates, Himalaya Publishing House.
2. Bhamrah, H.S. *et al.,* 2002- A text Book of Invertebrates –Anmol Publications.
3. Ekambaranatha Iyer .M.A. 1992. Manual of Zoology – Part I - Invertebrata - S.Viswanathan Printers and Publishers.
4. Nair N.C, Murugan. T, Arumugam .2010 -A Text Book of Invertebrates- Saras publications.

Course Outcomes

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall the general characters and classification of Protozoa	1,3	Remembering
CO-2	Relate the characters of Porifera and Coelenterata	1,2,3	Understanding
CO-3	Illustrate the Life cycle of Platyhelminthes and Aschelminthes	1,3,5	Applying
CO-4	Compare and contrast the characters of Annelids and Arthropods	1,2,3	Analysing
CO-5	Assess the Life history of *Pila globosa* (Mollusca)	1,2,3,5	Evaluating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credit
I	21UCZO11	Animal diversity -I	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓			✓	✓		✓		
CO-2	✓	✓		✓		✓	✓	✓		
CO-3	✓	✓			✓	✓		✓		✓
CO-4	✓	✓	✓		✓	✓	✓	✓		
CO-5	✓		✓		✓	✓	✓	✓		✓
	Number of matches (✓) = …31…. Relationship = Low/Medium/High Low (If the No. of matches are less than 25) Medium (If the No. of matches are between 25 and 33) High (If the No. of matches are more than 33)									

Prepared by — Checked by

Dr.S.Peer Mohamed

Signature — Head of the Department

Semester – I

Course Title	**ANIMAL DIVERSITY-II (CHORDATA)**
Total Hrs	**60**
Hrs/Week	**4**
Sub.Code	**21UCZO12**
Course Type	**Core**
Credits	**4**
Marks	**100**

General Objective:

To study the structure, functional organization, adaptations and the economic importance of lower and higher chordates

Course Objectives: The learner will be able to

CO	Course Objectives
CO-1	Define the general characters of chordates
CO-2	Classify the fresh water and marine fishes
CO-3	Sketch amphibians and reptiles
CO-4	Compare and contrast the flight adaptation of different birds
CO-5	Distinguish the characteristic features of various species of mammals

UNIT I

Introduction to Chordata: General characters and classification upto classes with examples.

Prochordata: General characters and classification upto orders with examples. **Type Study:** Ascidian – External morphology- Life history

External features and biological significance of the following Examplesa) Amphioxus b) Balanoglossus

Agnatha: Petromyzon – External morphology -Ammocoetes Larva.

UNIT -II

Pisces: General Characters and Classification upto sub-classes with examples **Type Study:**Scoliodon – External characters – Placoid scales – Digestive system .

General Topics: (i) Accessory respiratory organs in fishes. (ii) Migration of fishes,(iii) Commercial freshwater Edible fishes (Catla,Rohu,Mrighal and Cat fishes).

UNIT - III

Amphibia : General Characters and Classification upto orders with examples.

External features and Biological Significance of the following examples a) Rhachophorus b) Axolotl Larva

General Topic: Parental care in Amphibia.

Reptilia: General Characters and Classification up to orders with examples.

External features and Biological significance of the following examples a) Chamaeleon b) Draco c) Cobra d) Enhydrina

General Topics: (i) Identification of poisonous and non-poisonous snakes of South India. (ii) Poison Apparatus – Biting mechanism – Venom – Antivenom – First aid for snake bite

UNIT IV

Aves: General characters and classification upto subclasses with examples.

Type study:*Columbalivia* – External characters – Exoskeleton – Flight muscles – Respiratory system

General Topics: (i) Migration of Birds, (ii) Flight adaptations in Birds (iii)Flightless Birds

UNIT V

Mammalia: General Characters and Classification upto subclasses with examples.

Type Study: Rabbit – External Morphology – Dentition – Respiratory System – Circulatory system – Structure of Brain.

General topic: (i)Adaptations of aquatic mammals(ii)Egg laying Mammals

TEXT BOOKS

1. E.L.Jordan and P.S. Verma. 2014. Chordate Zoology. S. Chand & Company Ltd, New Delhi.
2. Kotpal, R. L. 2012. Text book of zoology vertebrates,Global media Publications.

REFERENCE BOOKS

1. A Text Book Of Zoology Chordata by B.D. Singh (Author) Publisher : KEDAR NATH RAM NATH; 2021st edition (1 January 2020); KEDAR NATH RAM NATH, 132, R.G. College Roads, Meerut-250001 (U.P.)
2. Mohan P. Arora , (2018) Chordata – I, Himalaya Publishing House Pvt. Ltd
3. B.N. Pandey ,VartikaMathur (2018) Biology of Chordates PHI Learning
4. Kardong, (2005) K.V.Vertebrates Comparative Anatomy,Function and Evolution. IV Edition.McGrawhill Higher Education.
5. Ekambaranatha Iyer . M. and Anathakrishnan T. N.A Manual of Zoology - Vol. II –Chordata - S. Viswanathan Printers and Publishers Pvt. Ltd. Chennai.

Course Outcomes

CO	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Identify the general characteristics and the classification of Chordates.	1,2,3	Remembering
CO-2	Relate the respiratory organs in fishes and their adaptation with environment	1,2,3,5	Understanding
CO-3	Interpret the characters of Amphibians and Reptiles	1,2,3,5	Applying
CO-4	Review the unique characters and functions of aves with reference to their adaptations.	1,2,3,5	Evaluating
CO-5	Compose the classification and characters of Mammals.	1,2,3,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credit
I	21UCZO12	ANIMAL DIVERSITY-II (CHORDATA)	60	4

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓		✓		✓	✓	✓	✓		
CO-2	✓	✓	✓	✓		✓	✓	✓		✓
CO-3	✓	✓	✓		✓	✓	✓	✓		✓
CO-4	✓	✓	✓			✓	✓	✓		✓
CO-5	✓	✓	✓	✓		✓	✓	✓		✓
	Number of matches (✓) = 37- Medium Relationship = High Low (If the No. of matches are less than 25) Medium (If the No. of matches are between 25 and 33) High (If the No. of matches are more than 33)									

Prepared by
Name :Dr. M. I. Zahir Hussain

Checked by
Head of the Department

SEMESTER - I

Course Title	ANIMAL DIVERSITY I AND II PRACTICALS
Total Hrs	30
Hrs/Week	2
Sub.Code	18UCZO1P1
Course Type	Practicals
Credits	1
Marks	100

General Objective:

To impart knowledge on specific characteristics of invertebrates and chordates.

Course Objectives: The learners will be able to:

CO No.	Course Objectives
CO-1	Examine the structure of Nervous system and digestive system of a cockroach.
CO-2	Understand the structure of salivary glands and oral system of a cockroach.
CO-3	Determine the features of different types of scales in fish.
CO-4	Compare the nervous system of animals with human beings.
CO-5	Create a model regarding the features of poisonous snakes.

DISSECTION AND MOUNTING

1. Earth worm - Body setae and Penial setae.
2. Cockroach - Nervous system, digestive system, salivary gland and mouth parts.
3. Shark - Placoid scales.Teleost fish - ctenoid and cycloid scales, chick - brain mounting
4. Key for Identification of poisonous and non-poisonous snakes
5. Museum specimens, slides, models and charts:
   Protozoa –*Amoeba proteus*, *Euglena viridis*, *Paramecium caudatum*; **Porifera –***Sycon ciliatum*, *Leucosolenia cervicornis* ; **Coelenterata -** *Obelia sp, Physalia sp, Aurelia* sp; **Platyhelminthes -** *Taenia solium*, *Fasciola hepatica;* **Aschelminthes -** Male and female *Ascaris lumbricoides, Ancylostoma duodenale***; Annelida**- Pheretima,Nereis, *Chaetopterus;* **Arthropoda -** *Penaeus monodon*, *Periplaneta americana*, *Bombyx mori***,** *Apis indica***; Mollusca**–*Sepiaglobosa*, octopus*, Pila;* **Echinodermata -** Echinus, Cucumaria, Star fish. **Prochordata**-Amphioxus, Herdmania, Balanoglossus. **Agnatha**-Tornaria larva, Petromyzon,**Pisces-** Narcine, Scoliodon, Anguilla, **Amphibia-***Draco,Rhacoporus,* **Reptilia**-*Chamaeleon, Enhydrina, Naja naja,***Aves-** King Fisher, Pigeon **Mammals-** Bat, Rabbit,

An "animal album" containing photographs, cut outs, with appropriate write up about the commonly available animals from different taxa.

Different topics may be given to different sets of students for this purpose.

Textbooks: Lab Manual

Course Outcomes

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Classify the structure and functions of Body setae and Penial setae in Earthworms.	1,2,3	Understanding
CO-2	Sketch the brain of chick.	1,2,3,4	Applying
CO-3	Explain the anatomy of various organ systems of Cockroach.	1,2,3	Analysing
CO-4	Experiment the Placoid ,Cycloid and Ctenoid scales.	1,2,3,4	Evaluating
CO-5	Infer the features of poisonous and non-poisonous snakes.	1,2,3,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credit
I	18UCZO1P1	ANIMAL DIVERSITY I AND II PRACTICALS	30	1

Course Outcomes (COS)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓			✓	✓	✓	✓		
CO-2	✓	✓			✓	✓	✓	✓	✓	
CO-3	✓	✓			✓	✓	✓	✓		
CO-4	✓	✓			✓	✓	✓	✓	✓	
CO-5	✓	✓			✓	✓	✓	✓		✓
	Number of matches (✓) = …33…. Relationship = High									

Prepared by Checked by.

Dr.S.Mohamed Ramlath Sabura Head of the Department

Semester – I

Course Title	FOOD SCIENCE
Total Hrs	60
Hrs/Week	4
Subject Code	21UAAN11
Course Type	Alllied
Credits	3
Marks	100

General Objective:

This course covers the importance of food groups, nutritional value and their preparation.

Course Objectives: The learners will be able to….

CO.	Course Objectives
CO-1	Observe the vital link between food and nutrients.
CO-2	Employ different methods of cooking
CO-3	Compare the nutritive values of nuts
CO-4	Evaluate the nutritive value of vegetables
CO-5	Develop innovative methods to discover adulterants

UNIT I - INTRODUCTION TO FOOD SCIENCE

Human health: Definition, food and nutrition- Classification of food according to functions, Food groups: Basic IV, V-Food pyramid.

Preliminary preparation of food, Different methods of cooking and their influence on nutrient retention.

UNIT II - CEREALS AND PULSES

Cereals and millets – Structure of wheat and nutritive value of rice, wheat and ragi; Parboiling of rice – Advantages.

Pulses, – Nutritive value–Germination of pulses and its advantages; Factors influencingcooking quality of pulses.

UNIT III FATS AND OIL

Nuts and oil seeds – Nutritive value of groundnuts, soybeans, sesame, coconut.

Kinds of fats and oils- Mustard oil, sunflower oil, Safflower oil and its importance.

Stages of sugar cookery.

UNIT IV- PLANT FOODS

Vegetables –Classification, Nutritive value, pigments in vegetables and changes during cooking.

Fruits – Classification, nutritive value and browning reaction

Types of beverages.

UNIT V - ANIMAL FOODS

Milk – Nutritive value- different types of milk and milk products.

Egg – Structure and nutritive value –uses of egg in cookery.

Flesh foods- Nutritive value – methods of selection of fish, poultry, and meat.

Food Adulteration –common food adulterants and its harmful effects.

TEXT BOOK

B. Srilakshmi., Food Science, 7th Edition, 2018, New age International (P) limited publishers.

REFERENCE BOOKS:

1. Dr.M. Swaminathan, Advanced Text – Book on Food & Nutrition, Bappco, Bangalore. 1985
2. N. Shakuntala Manay, M. Shadaksharaswamy, Foods Facts and principles, New age International (p) Ltd., Publishers Second Edition, 2001
3. Food Science, Potter, AVI publishing Company, New York, USA-1992.

Course Outcomes

CO.	Course Outcomes	PSOs Addressed	Cognitive level
CO-1	Summarize the basics of food science and its classification.	1,2,5	Understanding
CO-2	Experiment the processing techniques of cereals and pulses.	1,3,5	Applying
CO-3	Categorize the different types of oil and its influence on health.	1,4,5	Analyzing
CO-4	Assess the loss of nutrients during cooking of vegetables and fruits .	1,2,3,5	Evaluating
CO-5	Adapt innovative technologies in the production of milk products.	1,2,4,5	Creating

Relationship Matrix

Semester	Course Code		Title of the Course			Hours			Credit	
I	21UAAN11		FOOD SCIENCE			60			3	
Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓	✓			✓
CO-2	✓	✓	✓	✓		✓		✓		✓
CO-3	✓	✓	✓	✓		✓			✓	✓
CO-4	✓	✓	✓	✓		✓	✓	✓		✓
CO-5	✓	✓	✓	✓		✓	✓		✓	✓
	Number of matches (✓) = 37 Relationship = Low/Medium/High Low (If the No. of matches are less than 25) Medium (If the No. of matches are between 25 and 33) High (If the No. of matches are more than 33)									

Prepared by

Name: F. FATHIMA FARZANA
Assistant Professor,
Department of Applied Nutrition and Public Health

Signature:

Checked by

Head of the Department

Semester – I

Course Title	**FOOD SCIENCE PRACTICALS**
Total Hrs	**30**
Hrs/Week	**2**
Subject Code	**21UAAN1P1**
Course Type	**Allied Practical**
Credits	**1**
Marks	**100**

General Objective:

This course covers the basics of food preparation.

Course Objectives: The learners will be able to:

Co. No.	Course Objectives
CO-1	Identify the basic food groups
CO-2	Observe the methods of cooking
CO-3	Discover the stages of cooking sugar
CO-4	Examine the adulterants in food products
CO-5	Prepare a variety of recipes

FOOD SCIENCE PRACTICALS-I

1. Identification of food groups.
2. Tests for detecting food adulteration.
3. Identification of different stages of sugar cooking.
4. Preparation of
    a. Cereals
    b. Pulses
    c. Milk products
    d. Meat and fish and poultry
    e. Egg

Course Outcomes

CO. No.	Course Outcomes	PSOs Addressed	Cognitive level
CO-1	List various food groups.	1,3,4	Remembering
CO-2	Practice different stages of sugar cookery.	3,4,5	Applying
CO-3	Analyze the food adulterants	1,2,4,5	Analyzing
CO-4	Assess different methods of cooking and their influence on nutrient retention.	1,24,5	Evaluating
CO-5	Develop new recopies on pulses, milk products, meat, fish, poultry and egg.	2,34,5	Creating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credit
I	21UAAN1P1	FOOD SCIENCE PRACTICALS – I	2	1

Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓	✓		✓		✓	✓	
CO-2	✓	✓	✓	✓				✓	✓	✓
CO-3	✓	✓	✓	✓		✓	✓		✓	✓
CO-4	✓	✓	✓	✓		✓	✓		✓	✓
CO-5	✓	✓	✓	✓	✓		✓		✓	✓
	Number of matches (✓) = 38 Relationship = Low/Medium/**High** Low (If the No. of matches are less than 25) Medium (If the No. of matches are between 25 and 33) High (If the No. of matches are more than 33)									

Prepared by
Name: F. Fathima Farzana
Signature:

Checked by
Head of the Department