MAHATMA GANDHI UNIVERSITY

Priyadarshini Hills, Kottayam 686 560

CURRICULUM OF

CHOICE BASED CREDIT SYSTEM

FOR

UNDERGRADUATE

ZOOLOGY PROGRAMME

2017 ADMISSION ONWARDS

Semester 1

No	Course Code	Course Title	Course Category	Hrs per week	Credits	Marks ratio	
						Intl	Extl
1		English - 1	Common Course I	5	4	1	4
2		English - 2	Common Course II	4	3	1	4
3		Second Language – 1	Common Course III	4	4	1	4
4	ZY1CRT01	General perspectives in Science & Protistan Diversity	Core Course I : Theory	2	2	1	4
5		Practical : General perspectives in Science & Protistan Diversity	Core Course I : Practical	2	0	0	0
6		Chemistry 1/ Biochemistry 1	Complementary Course I : Theory	2	2	1	4
7		Chemistry 1	Complementary Course I : Practical	2	0	0	0
8		Botany 1	Complementary Course II : Theory	2	2	1	4
9		Botany 1	Complementary Course II : Practical	2	0	0	0
Total				**25 hrs**	**17**		

Semester 2

No	Course Code	Course Title	Course Category	Hrs per week	Credits	Marks ratio	
						Intl	Extl
1		English 3	Common Course IV	5	4	1	4
2		English 4	Common Course V	4	3	1	4

3		Second Language -2	Common Course VI	4	4	1	4
4	ZY2CRT02	Animal Diversity- Non Chordata	Core Course II : Theory	2	2	1	4
5		Animal Diversity – Non Chordata	Core Course II : Practical	2	2	1	4
6		Chemistry – II / Biochemistry - II	Complementary Course I : Theory	2	2	1	4
7		Chemistry – II / Biochemistry - II	Complementary Course I : Practical	2	2	1	4
8		Botany – II	Complementary Course II : Theory	2	2	1	4
9		Botany – II	Complementary Course II : Practical	2	2	1	4
Total				**25 hrs**	**23**		

Semester 3

No	Course Code	Course Title	Course Category	Hrs per week	Credits	Marks ratio	
						Intl	Extl
1		English 5	Common Course VII	5	4	1	4
2		Second Language 3	Common Course VIII	5	4	1	4
3	ZY3CRT03	Animal Diversity – Chordata	Core Course III : Theory	3	3	1	4
4		Animal Diversity- Chordata	Core Course III : Practical	2	0	0	0
5		Chemistry – III / Biochemistry - III	Complementary Course I : Theory	3	3	1	4
6		Chemistry – III / Biochemistry - III	Complementary Course I : Practical	2	0	0	0
7		Botany III	Complementary Course II : Theory	3	3	1	4
8		Botany III	Complementary Course II :	2	0	0	0

7. SCHEME OF DISTRIBUTION OF INSTRUCTIONAL HOURS

B.Sc. ZOOLOGY PROGRAMME : CORE COURSES –MODEL I

Name of semester	Theory	Practical
First semester	2	2
Second semester	2	2
Third semester	3	2
Fourth semester	3	2
Fifth semester	16	8
Field study & group activity	1	
Sixth semester	16	8
Project work (in sixth sem.), Visit to research institute	1	
Total	**44**	**24**

RECORDS

1. General perspectives in Science & Protistan Diversity
2. Animal Diversity –Non Chordata
3. Animal Diversity - Chordata
4. Research Methodology, Biophysics and Biostatistics
5. Environmental Biology & Human rights
6. Cell Biology & Genetics
7. Evolution and Ethology & Zoogeography
8. Human Physiology, Biochemistry & Endocrinology
9. Developmental Biology
10. Microbiology and Immunology
11. Biotechnology, Bioinformatics & Molecular Biology
12. Occupational Zoology

Each Record will be having external and internal evaluation. A total of 1 credit will be allotted for each record and respective practical.

FIELD STUDY/ (STUDY TOUR)

Study tour/ field study, visit to research institute and various places of zoological Importance

A study tour is compulsory**.** Field study/study tours should be conducted for not less than 6 days (completed during the entire programme), preferably spreading the study in the first to sixth semesters. Students are expected to visit research institutes and various places of zoological importance.

10. SCHEME OF EXAMINATIONS

a. SCHEME OF EXAMINATION - THEORY (CORE COURSE)

Theory Examinations will be conducted by the University at the end of the respective semester in which the course is conducted. Duration 3 Hrs (Internal External ratio =1:4)

Sem	Course Code	Course Title	Course Category	Duration	Marks ratio		Credits
				Hrs	Internal (I)	External (E)	
1	ZY1CRT01	General perspectives in Science & Protistan Diversity	1	2	1	4	2
2	ZY2CRT02	Animal Diversity – Non Chordata	2	2	1	4	2
3	ZY3CRT03	Animal Diversity-Chordata	3	3	1	4	3
4	ZY4CRT04	Research Methodology, Biophysics and Biostatistics	4	3	1	4	3
5	ZY5CRT05	Environmental Biology & Human rights	5	3	1	4	3
5	ZY5CRT06	Cell Biology & Genetics	6	3	1	4	3
5	ZY5CRT07	Evolution, Ethology & Zoogeography	7	3	1	4	3
5	ZY5CRT08	Human Physiology, Biochemistry & Endocrinology	8	3	1	4	3
6	ZY6CRT09	Developmental Biology	9	3	1	4	3
6	ZY6CRT10	Microbiology and Immunology	10	3	1	4	3
6	ZY6CRT11	Biotechnology, Bioinformatics & Molecular Biology	11	3	1	4	3
6	ZY6CRT12	Occupational Zoology (Aquaculture, Apiculture,Vermiculture	12	3	1	4	3

		& Quail farming)					
Zoology Open Course Sem 5 *(Select any 1 from 3)*	ZY5OPT01	Vocational Zoology (Apiculture, Vermiculture, & Ornamental Fish Culture)	Open course (for other streams)-1	4	1	4	3
	ZY5OPT02	Public Health & Nutrition	Open course -2				
	ZY5OPT03	Man, Nature & Sustainable Development	Open course -3				
Sem 6 *(Select any 1 from the four)*	ZY6CBT01	Ecotourism & Sustainable Develpoment	Choice Based Course-1	4	1	4	3
	ZY6CBT02	Agricultural Pest Management	Choice Based Course-2				
	ZY6CBT03	Vector & Vector Bourne Diseases	Choice Based Course-3				
	ZY6CBT03	Nutrition,Health & Life Style Management	Choice Based Course -4				

b. SCHEME OF PRACTICAL EXAMINATIONS

University Practical Examinations will be conducted at the end of even semester 2, 4 and 6.

Semester	**Code**	**Practical No.**	**Course Title**	**Duration**	**Marks ratio**		**Credits**
				Hrs	**Internal (I)**	**External (E)**	
2	ZY2CRP01	I	General Perspectives in Science, Protistan Diversity & Animal Diversity – Non Chordata	3 Hrs	1	4	2
4	ZY4CRP02	II	Animal Diversity – Chordata, Research methodology, Biophysics &	3 Hrs	1	4	2

11. COMPLEMENTARY ZOOLOGY COURSES OFFERED BY ZOOLOGY DEPARTMENT FOR - MODEL I – BSc BOTANY / BSc HOME SCIENCE
MODEL II – BSc BOTANY / VOCATIONAL SUBJECTS
MODEL III – BSc (BIOLOGICAL TECHNIQUES AND SPECIMEN PREPARATION)

Semester	Code	Title of the Course	Hrs	Inst Hrs/week	Credit
1	ZY1CMT01	Non Chordate Diversity	36	2	2
1		Non Chordate Diversity (Practicals)	36	2	0
2	ZY2CMT02	Chordate Diversity	36	2	2
2		Chordate Diversity (Practicals)	36	2	0
2	ZY2CMP01	**Practical 1** Non Chordate Diversity + Chordate Diversity (Practicals)			2
3	ZY3CMT03	Physiology and Immunology	54	3	3
3		Physiology and Immunology (Practicals)	36	2	0
4	ZY4CMT04	Applied Zoology	54	3	3
		Applied Zoology (Practicals)	36	2	
4	ZY4CMP02	**Practical 2** Physiology and Immunology + Applied Zoology (Practical)			2

12. SYLLABUS:

B.Sc ZOOLOGY PROGRAMME

MODEL – I

THEORY & PRACTICALS

SEMESTER 1. ZY1CRT0I. CORE COURSE 1.

GENERAL PERSPECTIVES IN SCIENCE & PROTISTAN DIVERSITY

36 Hrs

Credits 2

Objectives:

- To create an awareness on the basic philosophy of science, concepts and scope
- To understand different levels of biological diversity through the systematic classification
- To familiarize taxa level identification of animals
- To make interest in Protistan diversity
- To impart knowledge on parasitic forms of lower invertebrates.

PART I PERSPECTIVES IN SCIENCE 8Hrs

Module I Introduction to Scientific Studies 4Hrs

Types of knowledge: practical, theoretical, and scientific knowledge. What is science, features of science, Deductive and inductive models, scientific temper, empiricism vocabulary of science.

Module II What is Biology? 4 Hrs

Life and its manifestations, History of Biology: Biology in ancient times Landmarks in the progress of Biology. Branches of Zoology , Scope of Zoology

PART II SYSTEMATICS 10 Hrs

Module III–Taxonomical Principles and tools

Systematic, Taxonomy, Phylogeny [Brief account] , Approaches to taxonomy, Molecular taxonomy, .Bar coding. Zoological nomenclature, International Code of Zoological Nomenclature (ICZN), Law of Priority. Five Kingdom Classification; Linnaean classification, Basis for Animal kingdom classification [Levels of organization, Symmetry, Coelom]

Identification tools

Taxonomic key. Types: Single access key- Dichotomous [linked and nested] and Polytomous key, Multi access key, Computer aided Interactive Key

Advantages and Disadvantages

PART III: PROTISTAN DIVERSITY **18 Hrs**

Module IV – Kingdom Protista Type**: *Paramecium*** **5 Hrs**

Salient features of KingdomProtista **10 Hrs**

Classification of Protista up to phyla

1. Phylum Rhizopoda :Eg. *Amoeba*
2. Phylum Actinopoda : Eg. *Actinophrys*
3. Phylum Dinoflagellata : Eg. *Noctiluca*
4. Phylum Parabasalia : Eg. *Trychonympha*
5. Phylum Metamonada : Eg. *Giardia*
6. Phylum Kinetoplasta : Eg. *Trypanosoma*
7. Phylum Euglenophyta : Eg. *Euglena*
8. Phylum Cryptophyta : Eg. *Cryptomonas*
9. Phylum Opalinata : Eg. *Opalina*
10. Phylum Bacillariophyta :Eg. Diatoms
11. Phylum Chlorophyta :Eg. *Volvox*
12. Phylum Choanoflagellata :Eg. *Proterospongia*
13. Phylum Ciliophora : Eg. *Balantidium coli*
14. Phylum Sporozoa : Eg. *Plasmodium*
15. Phylum Microsporidia :Eg. *Nosema*
16. Phylum Rhodophyta :Eg. Red Alga

(Mention any five general characters for each phylum. Detailed accounts of examples are not necessary.)

General Topics: **3 Hrs**

1. Parasitic protists (diseases mode of transmission and prophylactic measures) - Entamoeba, Trypanosoma, Plasmodium (detailed account of life cycle),Leishmania .

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Thomas A P (Editor) 2010 The Invertebrates, Green leaf publications Kottayam

SEMESTER 1

CORE COURSE PAPER 1

PERSPECTIVES IN SCIENCE & PROTISTAN DIVERSITY

(PRACTICAL)

36 Hrs

2 Credits

1. Taxa, identification techniques
   Bird body parts
   Butterfly/ dragonfly body parts
2. Identification using keys
   Insect, Fish, Snake (Poisonous & Non Poisonous)
   (Any 3 specimens from each category)
3. General identification - The students are expected to identify any 6 Protiatans studied by their generic names and write the general characters of their Phylum.
4. Identification of any 4 economically important protists/parasitic protists
   (Slides/figures may be used for identification)
5. Identification of two Protistan from pond water

SEMESTER 11. ZY2CRT02

CORE COURSE 11: ANIMAL DIVERSITY - NON CHORDATA

36 Hrs

Credits 2

Objectives:

- To create appreciation on diversity of life on earth
- To understand different levels of biological diversity through the systematic classification of invertebrate fauna
- To familiarize taxa level identification of animals
- To understand the evolutionary significance of invertebrate fauna
- To instill curiosity on invertebrates around us
- To impart knowledge on parasitic forms of lower invertebrates.

MODULE I Kingdom Animalia **7 Hrs**

Outline classification of Kingdom Animalia

Three branches **- Mesozoa, parazoa and Eumetazoa**

Mesozoa: Phylum Orthonectida - eg. *Rhopalura* (mention 5 salient features)

Parazoa:

1. Phylum Placozoa – Eg. *Trycoplax adherens*

2. Phylum Porifera – Classification upto classes; Mention gemmules

Class I- Calcarea. Eg.*Sycon.*,

Class II – Hexactinellida .Eg.*Euplectella.*

Class III - Demospongia Eg.*Cliona.*

General Topics

1. Canal system in sponges.

Phylum Coelenterata -Classification upto classes

Class I - Hydrozoa Eg. *Eg. Obelia* - mention Metagenesis

Class II- Scyphozoa Eg. *Rhizostoma.*

Class III- Anthozoa Eg. *Metridium*.

General Topics:

1. Coral and coral reefs with special reference to conservation of reef fauna.

2. Polymorphism in Coelenterates

Phylum Ctenophora - Eg. *Pleurobrachia.*

MODULE II .

Phylum Platyhelminthes Salient features; classification up to classes **3 Hrs**

Class I - Turbellaria. Eg. *Planaria.*

Class II –Trematoda Eg. *Fasciola*

Class III- Cestoda Eg. *Taenia saginata.*

General Topics:

1. Life history of *Fasciola hepatica.*

2. Platyhelminth parasites of Man and Dog (*Schistosoma*, *Taenia solium, Echinococcus*).

Phylum Nemathelminthes(Nematoda) **2 Hrs**

Salient features, classification up to classes

Class: Phasmidia Eg. *Enterobius,*

Class: Aphasmidia Eg. *Trichinella*

General Topic

Pathogenic nematodes in man. (*Wuchereria bancrofti, Ascaris lubricoides, Ancylostoma duodenale, Trichinella).*

Phylum Annelida: 2 Hrs

Salient features, Classification upto classes.

Class I- Archiannelida Eg. *Polygordius*

Class II -Polychaeta Eg. *Chaetopterus*

ClassIII- Oligochaeta Eg. *Megascolex.*

Class IV- Hirudinea Eg. *Ozobranchus, Hirudinaria*

MODULE III 14 Hrs

Phylum Onychophora

Eg. Peripatus (Mention its affinities).

Phylum Arthropoda Salient features, Classification upto classes

Type: Prawn –*Fenneropenaeus (Penaeus)*

1. Sub Phylum - Trilobitomorpha

Class -Trilobita (mention the salient features).

Eg.*Triarthrus* – A trilobite (extinct)

2. Subphylum –Chelicerata

Class 1 Merostomata (Xiphosura) (Eg. *Limulus*)

Class 2.Arachnida (Eg., *Palamnaeus*- Scorpion)

Class 3 Pycnogonida (Eg. *Pycnogonum* – Sea spider)

3. Subphylum- Crustacea

Class 1 Branchiopoda Eg. *Daphnia*

Class 2 Ostracoda Eg. *Cypris* -seed shrimp

Class 3 Copepoda Eg. *Cyclops*

Class 4 Remipedia Eg. *Speleonectes* (eyeless crustacean seen in caves)

Class 5.Branchiura Eg.,*Argulus* (common fish louse)

Class 6 Cirripedia Eg. *Sacculina* (parasitic castrator of crabs)

Class 7 Malacostraca Eg. *Squilla* (spot tail mantis shrimp)

4. Subphylum- Uniramia

Class 1 Chilopoda Eg. *Scolopendra* – (Centipede)

Class 2 Symphyla Eg. *Scutigerella* – (garden centipedes or pseudocentipedes)

Class 3 Diplopoda Eg. *Spirostreptus*- (Millipede)

Class 4 Pauropoda Eg. *Pauropus*

Class 5 Hexapoda (Insecta) Eg.*Bombyx mori* – (silk moth)

MODULE IV

Phylum Mollusca **3 Hrs**

Salient features, Classification upto classes

Class I- Apalcophora Eg. *Neomenia*

Class II- Monoplacophora Eg. *Neopilina*

Class III Amphineura Eg. *Chiton*

Class IV Gastropoda Eg. *Aplysia*

Class V Scaphopoda Eg. *Dentalium*

Class VI Pelecypoda (Bivalvia) Eg. *Pinctada*

Class VII Cephalopoda Eg. *Sepia*

Phylum Echinodermata **3 Hrs**

Classification upto classes

Class I- Asteroidea Eg. *Astropecten*

Class II- Ophiuroidea Eg. *Ophiothrix*

Class III- Echinoidea Eg. *Echinus*

Class IV- Holothuroidea Eg. *Holothuria*

Class V – Crinoidea Eg.*Antedon*

General Topics

1. Water vascular system in Echinodermata

Phylum Hemichordata: **2 Hrs**

Eg. Balanoglossus

Minor Phyla

1. Chaetognatha Eg. *Sagitta*

2. Sipunculida Eg. *Sipunculus*

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PRACTICAL

ANIMAL DIVERSITY- NON CHORDATA

36 Hrs.

Credit 1

Scientific Drawing:-

Make scientific drawings of 5 locally available invertebrate specimens belonging to different phyla.

Anatomy:-

Study of sections. (Any two)

1. Hydra.
2. Ascaris(male and female)
3. Earthworm
4. Fasciola

Dissections

1. Prawn - Nervous system
2. Cockroach - Nervous system

Mounting:-

1. Prawn appendages.
2. Mouth parts - Cockroach/ Plant bug/ House fly / Mosquito. (Any Three)

Identification:-

General identification &classification - The students are expected to identify, classify and describe the following Phylum -wise number of animals by their common names, generic names and 30% of these by their scientific names. Porifera-1, Coelenterata-3, Platyhelminthes-2, Annelida-2, Arthropoda-5, Mollusca- 4, Echinodermata-3

Identification of (a) Parasitic protest – any 2 (b) larval forms of *Fasciola*- any 2 (c) Nematode parasites of man- any 3 (Slides/figures may be used for study)

Taxonomic identification with key:-

Identification of insects up to the level of Order (any Four).

SEMESTER 111. ZY3CRT03

CORE COURSE 111: ANIMAL DIVERSITY –CHORDATA

54 Hrs

3 Credits

Objectives

- To acquire in depth knowledge on the diversity of chordates and their systematic position.
- To make them aware of the economic importance of some classes.
- To understand the evolutionary importance of selected chordate groups