

DRAFT version of UG syllabus for Zoology Major (Based on NEP)

SEM I [22 CREDITS]

Semester	Course	Title of the Course	Credits	Full Marks
SEM-I	ZOOL-MC-1-T	Non-Chordates I (Theory)	04	25+10*
	ZOOL-MC-1-P	Non-Chordates I (Practical)		15
	ZOOL-MC-2-T	Non-Chordates II (Theory)	04	25+10*
	ZOOL-MC-2-P	Non-Chordates II (Practical)		15
	ZOOL-MnC-1-T	Animal Diversity (Theory)	04	25+10*
	ZOOL-MnC-1-P	Animal Diversity (Practical)		15
	IDC/MDC-1		03	
	ZOOL-SEC-1	Apiculture	03	40+10*
	AEC-1	Modern Indian Language (MIL-1)	02	
	VAC-1	Environmental Studies (ENVS)	02	
Total Credit for Semester I			22	

(* Internal Assessment)

MAJOR COURSE (MC)

ZOOL-MC-1: Non-Chordates I (Protists to Pseudo-coelomates)

[Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)] [04 CREDITS]

ZOOL-MC-1-T (Full marks = 25)

Unit 1: Basics of Animal Classification: Six kingdom concept of classification (Carl Woese)

Unit 2: Protista: General characteristics and classification up to phylum; Locomotion in *Euglena*, *Paramecium* and *Amoeba*; Conjugation in *Paramecium*; Life cycle and pathogenicity of *Plasmodium vivax* and *Entamoeba histolytica*, Origin of Metazoan.

Unit 3: Porifera: General characteristics and classification up to classes; Type study of *Sycon*; Canal system, cell types and spicules in sponges.

Unit 4: Cnidaria: General characteristics and classification up to classes; General morphology and metagenesis in *Obelia* and *Aurelia*; Polymorphism in Cnidaria; Corals and coral reef diversity, function & conservation.

Unit 5: Ctenophora: General characteristics and evolutionary significance; Type study of *Hormiphora*.

Unit 6: Platyhelminthes: General characteristics and classification up to classes; Reproductive system, Life cycle, pathogenicity, parasitic adaptations and control measures of *Fasciola hepatica* and *Taenia solium*.

Unit 7: Nematelminthes: General characteristics and classification up to classes; Reproductive system, Life cycle, pathogenicity, parasitic adaptations and control measures of *Ascaris lumbricoides* and *Wuchereria bancrofti*

ZOOL-MC-1-P (Full marks = 15)

Group A: Laboratory experimentation (= 10marks)

1. Study of whole mount of *Euglena*, *Amoeba* and *Paramecium*

2. Identification:

a. *Amoeba*, *Euglena*, *Entamoeba*, *Opalina*, *Paramecium*, *Plasmodium vivax* and *Plasmodium falciparum* (from the prepared slides).

b. *Sycon*, Neptune's Cup, *Obelia*, *Physalia*, *Millepora*, *Aurelia*, *Tubipora*, *Corallium*, *Alcyonium*, *Gorgonia*, *Metridium*, *Pennatulula*, *Fungia*, *Meandrina*, *Madrepora*, *Porpitta*, *Vellela*.

c. Adult *Fasciola hepatica*, *Taenia solium* and *Ascaris lumbricoides*.

3. **Staining/mounting:** Any protozoa/helminth from gut of cockroach.

Group B: Laboratory note book and Viva voce (2+3=5 marks)

Periodic updating of laboratory note-book and Viva-voce covering mostly the experimental works allotted during the final examination.

ZOOL-MC-1-IA: Internal Assessment (Full marks = 10*)

(*To be done by the Concerned College)

ZOOL-MC-2: Non-Chordates II (Coelomates)

[Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)] [04 CREDITS]

ZOOL-MC-2-T (Full Marks: 25)

Unit 1: Introduction: Evolution of coelom and metamerism.

Unit 2: Annelida: General characteristics and classification up to classes: Type study of *Pheretima* sp. (morphology, locomotion, circulation and reproduction), Excretion in Annelida.

Unit 3: Arthropoda: General characteristics and classification up to classes; Respiration in Arthropoda (gills in prawn and trachea in cockroach), Metamorphosis in Lepidopteran insects, Vision in insects, General organization and evolutionary significance of *Limulus* sp.

Unit 4: Onychophora: General characteristics and evolutionary significance.

Unit 5: Mollusca: General characteristics and classification up to classes; Nervous system and torsion in Gastropoda; Feeding and respiration in *Pila* sp.

Unit 6: Echinodermata: General characteristics and classification up to classes; Water-vascular system in Asteroidea; Larval forms in Echinodermata; Affinities with Chordates.

Unit 7: Hemichordata: General characteristics of phylum Hemichordata; Feeding in *Balanoglossus*, Tornaria larva, Relationship with non-chordates and chordates.

ZOOL-MC-2-P (Full Marks: 15)

Group A: Laboratory experimentation (= 10marks)

1. Study of following specimens:

- a. **Annelids** - *Aphrodite*, *Nereis*, *Heteronereis*, *Sabella*, *Serpula*, *Chaetopterus*, *Pheretima*, *Hirudinaria*
- b. **Arthropods** - *Limulus*, *Palamnaeus*, *Palaemon*, *Daphnia*, *Balanus*, *lepas*, *Sacculina*, *Carcinus*, *Eupagurus*, *Buthus*, *Scolopendra*, *Julus*, *Bombyx*, *Periplaneta*, termites and honey bees
- c. **Onychophora**- *Peripatus*
- d. **Molluscs** - *Chiton*, *Dentalium*, *Pila*, *Doris*, *Helix*, *Unio*, *Mytilus*, *Ostrea*, *Pinctada*, *Sepia*, *Octopus*, *Nautilus*, *Loligo*.
- e. **Echinodermates** - *Pentaceros/Asterias*, *Ophiura*, *Clypeaster*, *Echinus*, *Cucumaria* and *Antedon*.

2. **Mounting** of mouth parts of *Periplaneta* sp. dissection of digestive system and nervous system of *Periplaneta* (demonstration).

3. **Submission** of field report on visit of any area of Zoological importance.

Group B: Laboratory note book and Viva voce (2+3= 5 marks)

Periodic updating of laboratory note-book and Viva-voce covering mostly the experimental work allotted during examination

Internal Assessment (Full marks = 10)* [ZOOL-MC-2-IA]

(*To be done by the Concerned College)

SKILL ENHANCEMENT COURSE (SEC)

[Allotted Marks- 50 (Theory: 40, Internal Assessment: 10)] [03 CREDITS]

Apiculture (= 40 marks) [ZOOL-SEC-1]

Unit 1: Biology of Bees-(i) History, Classification and Biology of Honey Bees (ii) Social Organization of Bee Colony

Unit 2: Rearing of Bees-(i) Artificial Bee rearing (Apiary), Beehives – Newton and Langstroth, (ii) Bee Pasturage, (ii) Selection of Bee Species for Apiculture, Bee Keeping Equipment (iii) Methods of Extraction of Honey (Indigenous and Modern).

Unit 3: Diseases and Enemies-(i) Bee Diseases and Enemies (ii) Control and Preventive measures.

Unit 4: Bee Economy- Products of Apiculture Industry and its Uses (Honey, Bees Wax, Propolis), Pollen etc.

Unit 5: Entrepreneurship in Apiculture-(i) Bee Keeping Industry – Recent Efforts, Modern Methods in employing artificial Beehives for cross pollination in horticultural gardens.

Internal Assessment (Full marks = 10)*[ZOOL-SEC1-IA]

(*To be done by the Concerned College)

MINOR COURSE (MnC)

ZOOL-MnC-1: Animal Diversity

(Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks) [04 CREDITS]

ZOOL-MnC-1-T (Full Marks: 25)

Group A: Biology of Non-Chordates

Unit 1: Basics of Animal Classification - Six kingdom concept of classification (Carl Woese).

Unit 2: Protista and Metazoa - Protozoa-general characteristics and classification up to phylum, locomotion in *Euglena*, *Paramecium* and *Amoeba*, conjugation in *Paramecium*.

Unit 3: Porifera - General characteristics and classification up to classes, canal system in sponges.

Unit 4: Cnidaria - General characteristics and classification up to classes, metagenesis in *Obelia*; corals and coral reef diversity, functions & conservation.

Unit 5: Ctenophora - General characteristics and classification up to class.

Unit 6: Platyhelminthes - General characteristics and classification up to classes; life cycle and pathogenicity and control measures of *Fasciola hepatica*, parasitic adaptation of *Fasciola* sp.

Unit 7: Aschelminthes - General characteristics and classification up to classes, life cycle, and pathogenicity and control measures of *Ascaris lumbricoides*; Parasitic adaptation of *Ascaris* sp.

Unit 8: Annelida - General characteristics and classification up to classes, Excretion in Annelida.

Unit 9: Arthropoda - General characteristics and classification up to classes, Respiration in arthropoda (gills in prawn and trachea in cockroach).

Unit 10: Onychophora- General characteristics, body structure and evolutionary significance.

Unit 11: Mollusca: General characteristics and classification up to classes, Nervous system and torsion in gastropod; feeding and respiration in *Pila* sp.

ZOOL-MnC-1-P (Full Marks: 15)

Group A: Experimentation (Full Marks: 10)

Biology of Non-Chordates

1. Characterization of whole mount of *Paramecium* sp.

2. Identification of -

a. *Amoeba*, *Euglena*, *Opalina*, *Paramecium*, (from the prepared slides)

b. *Sycon*, Neptune's Cup, *Obelia*, *Physalia*, *Aurelia*, *Tubipora*, *Corallium*, *Alcyonium*, *Gorgonia*, *Metridium*, *Pennatula*, *Fungia*, *Meandrina*, *Madrepora* from museum specimen.

c. Adult *Fasciola hepatica*, *Taenia solium* and *Ascaris lumbricoides*

d. **Annelids:** *Aphrodite*, *Nereis*, *Heteronereis*, *Chaetopterus*, *Pheretima*, *Hirudinaria*

e. **Arthropods:** *Limulus*, *Palaemon*, *Daphnia*, *Balanus*, *Buthus*, *Eupagurus*, *Scolopendra*, *Julus*, *Bombyx*.

f. **Molluscs:** *Chiton*, *Doris*, *Unio*, *Sepia*, *Octopus*, *Nautilus*, *Loligo*, *Mytilus*.

g. **Echinodermate:** *Pentaceros/Asterias*, *Ophiura*, *Echinus*, *Cucumaria* and *Antedon*

3. Staining/mounting of any protozoa/helminth from gut of cockroach.

Biology of Chordates

1. Identification:

a. **Protochordata:** *Balanoglossus*, *Herdmania*, *Branchiostoma*; **Agnatha-** *Petromyzon*, *Myxine*.

Unit 12: Echinodermata: General characteristics and classification up to classes; water-vascular system in Asterozoa.

Unit 13: Hemichordata: General characteristics of phylum Hemichordata; relationship with non-chordates and chordates.

Group B: Biology of Chordates

Unit 1: Introduction to Chordates- General characteristics and outline classification of phylum Chordata.

Unit 2: Protochordata (invertebrate chordate) - General characteristics and classification of sub-phylum Urochordata and Cephalochordata up to classes; retrogressive metamorphosis in Ascidia; chordate features and feeding in *Branchiostoma*.

Unit 3: Agnatha- General characteristics and classification of Cyclostomes up to order.

Unit 4: Pisces: General characteristics and classification of Chondrichthyes and Osteichthyes up to subclasses, accessory respiratory organ in fishes.

Unit 5: Amphibia: General characteristics and classification up to living Orders, parental care in Amphibia.

Unit 6: Reptilia - General characteristics and classification up to living Orders, poison apparatus and biting mechanism in snake.

Unit 7: Aves - General characteristics and classification up to Sub-Classes, exoskeleton and migration in birds.

Unit 8: Mammals - General characteristics and classification up to living infraclasses, affinities of Prototheria.

b. **Fishes:** *Scoliodon*, *Sphyrna*, *Mystus*, *Heteropneustes*, *Labeo*, *Exocoetus*, *Echeneis*, *Anguilla*, *Hippocampus*, *Anabas*, Flat fish;

c. **Amphibia:** *Necturus*, *Bufo*, *Hyla*, *Axolotl*, *Tylotriton*.

d. **Reptilia:** *Chelone*, *Hemidactylus*, *Varanus*, *Uromastix*, *Chamaeleon*, *Vipera*, *Naja*;; Key for identification of poisonous and non-poisonous snakes.

e. **Mammalia:** bat (insectivorous and frugivorous), funambulus; pecten from fowl head

2. **Dissection** of Urino-genital system of *Tilapia* and Pituitary of *Labeo* (demonstration).

3. **Report** on a one-day visit to any area of Zoological importance

Group B: Practical note book and Viva-voce (3+2= 5 marks)

Internal Assessment (Full marks = 10)*[ZOOL-MnC-1-IA]

(*To be done by the Concerned College)