

**MODEL CURRICULUM FOR ZOOLOGY
IN UNDERGRADUATE DEGREE PROGRAMME
CBCS SYLLABUS SCHEDULE 2015-16**

I YEAR	II SEM	PAPER II	Animal Diversity - Chordates
II YEAR	III SEM	PAPER III	Cell Biology, Genetics & Evolution
	IV SEM	PAPER IV	Embryology, Physiology & Ecology

ACHARYA NAGARJUNA UNIVERSITY, NAGARJUNA NAGAR - 522510
ZOOLOGY SYLLABUS FOR II SEMESTER

ZOOLOGY - PAPER - II

ANIMAL DIVERSITY - CHORDATES

Periods: 48

Max. Marks: 75

Unit - I

1.1 Prochordata

- 1.1.1 Salient features of Cephalochordata
- 1.1.2 Structure of *Branchiostoma*
- 1.1.3 Affinities of Cephalochordata
- 1.1.4 Salient features of Urochordata
- 1.1.5 Structure and life history of *Herdmania*
- 1.1.6 Significance of Retrogressive metamorphosis

1.2 General characters of Chordata

Unit - II

2.1 Cyclostomata

- 2.1.1 General characters of Cyclostomata
- 2.1.2 Comparison of the *Petromyzon* and *Myxine*

2.2 Pisces

- 2.2.1 General characters of Fishes
- 2.2.2 Classification of fishes up to sub - class level with examples
- 2.2.3 *Scoliodon* - External features, Digestive system, Respiratory system, Heart, Brain
- 2.2.4 Migration in Fishes
- 2.2.5 Types of Scales
- 2.2.6 Dipnoi

Unit - III

3.1 Amphibia

- 3.1.1 General characters of Amphibian
- 3.1.2 Classification of Amphibia up to orders with examples.
- 3.1.3 *Rana hexadactyla* - External features, Digestive system, Respiratory system, Heart, Brain

3.2 Reptilia

3.2.1 General characters of Reptilia

3.2.2 Classification of Reptilia up to orders with examples

3.2.3 *Calotes* - External features, Digestive system, Respiratory system, Heart, Brain

3.2.4 Skull in reptiles

Unit - IV

4.1 Aves

4.1.1 General characters of Aves

4.1.2 Classification of Aves up to subclasses with examples.

4.1.3 *Columba livia* - External features, Digestive system, Respiratory system, Heart, Brain

4.1.4 Migration in Birds

4.1.5 Flight adaptation in birds

Unit - V

5.1 Mammalia

5.1.1 General characters of Mammalia

5.1.2 Classification of Mammalia up to sub - classes with examples

5.2 Comparision of Prototherians, Metatherians and Eutherians

5.3 Dentition in mammals

ZOOLOGY MODEL PAPER FOR II SEMESTER

ZOOLOGY - PAPER - II

ANIMAL DIVERSITY - CHORDATES

Time: 3 hrs

Max. Marks: 75

I. Answer any FIVE of the following :

5x5=25

Draw labeled diagrams wherever necessary

1. *Amphioxus*
2. Placoid scale
3. Quill feather
4. Prototheria
5. Anadromous migration
6. *Draco*
7. Emu
8. Apoda

II. Answer any FIVE of the following :

5x10=50

Draw labeled diagrams wherever necessary

9. Explain the life history of *Herdmania*

OR

Explain the origin and general characters of chordates

10. Compare the characters of *Petromyzon* and *Myxine*

OR

Describe the structure of heart of *Scoliodon*

11. Describe the brain of *Rana hexadactyla*

OR

Explain the external features of *Calotes*

12. Write an essay on flight adaptations in birds

OR

Explain the respiratory system of *Columba livia*

13. Compare the characters of Metatheria and Eutheria

OR

Write an essay on dentition in mammals

ZOOLOGY PRACTICAL SYLLABUS FOR II SEMESTER

ZOOLOGY - PAPER - II

ANIMAL DIVERSITY - CHORDATES

Periods: 24

Max. Marks: 50

Observation of the following slides / spotters / models

- Protochordata** : *Herdmania, Amphioxus, Amphioxus* T.S. through pharynx
- Cyclostomata** : *Petromyzon, Myxine*
- Pisces** : *Pristis, Torpedo, Channa pleuronectes, Hippocampus, Exocoetus, Echeneis, Labeo, Catla, Clarius, Anguilla, Protopterus*
Placoid scale, Cycloid scale, Ctenoid scale
- Amphibia** : *Ichthyophis, Amblystoma, Siren, Hyla, Rachophous*
Axolotal larva
- Reptilia** : *Draco, Chamaeleon, Uromastix, Vipera russeli, Naja, Bungarus, Enhydrina, Testudo, Trionyx, Crocodilus*
- Aves** : *Passer, Psittacula, Bubo, Alcedo, Columba, Corvus, Pavo*,
Study of different types of feathers: Quill, Contour, Filoplume down
- Mammalia** : *Ornithorhynchus, Tachyglossus, Pteropus, Funambulus, Manis, Loris*, Hedgehog
- Osteology** : Appendicular skeletons of Varanus, Pigeon
Rabbit - Skull, fore limbs, hind limbs and girdles

Demonstration of dissection / dissected / virtual dissection:

1. V, VII, IX, X cranial nerves of shark / locally available fishes
2. Arterial system, venous system of Shark / *Calotes* / Fowl / Rat
3. Digestive system of fish

Laboratory record work shall be submitted at the time of practical examination

Compulsory one species to be adopted for demonstration only by the faculty

ZOOLOGY SYLLABUS FOR III SEMESTER

ZOOLOGY - PAPER - III

CYTOLOGY, GENETICS AND EVOLUTION

Periods: 48

Max. Marks: 75

Unit - I

1.1 Cytology - I

1.1.1 Electron microscopic structure of cell

1.1.2 Plasma membrane - Fluid mosaic model

Transport functions of plasma membrane

1.1.3 Structure and functions of cell organelles - Endoplasmic reticulum, Golgi body, Ribosomes, Lysosomes and Mitochondria

1.2 Cytology - II

1.2.1 Nucleus

1.2.2 Chromosomes - Structure, types, functions

Unit - II

2.1 Biomolecules

2.1.1 Carbohydrates - Classification of carbohydrates

Structure of glucose

2.1.2 Proteins - Classification of proteins

General properties of amino acids

2.1.3 Lipids - Classification of lipids

2.2 Nucleic acids

2.2.1 Deoxyribo Nucleic Acid - Structure, replication

2.2.2 Ribo Nucleic Acid - Structure, types

Unit - III

3.1 Genetics - I

3.1.1 Mendel's work on transmission on traits

3.1.2 Principles of inheritance

3.1.3 Incomplete dominance and co-dominance

3.1.4 Lethal alleles, Epistasis, Pleiotropy

Unit - IV

4.1 Genetics - II

- 4.1.1 Sex determination
- 4.1.2 Sex linked inheritance
- 4.1.3 Linkage and crossing over
- 4.1.4 Extra chromosomal inheritance
- 4.1.5 Human karyotyping

Unit - V

5.1 Evolution

- 5.1.1 Origin of life
- 5.1.2 Lamarckism, Darwinism, Neo - Darwinism
- 5.1.3 Variations, isolating mechanisms, natural selection
- 5.1.4 Types of natural selection (directional, stabilizing, disruptive)
- 5.1.5 Artificial selection and forces of evolution
- 5.1.6 Speciation (Allopatric and Sympatric)
- 5.1.7 Macro evolutionary principles (Example: Darwin's finches)

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ZOOLOGY MODEL PAPER FOR III SEMESTER

ZOOLOGY - PAPER - III

CYTOLOGY, GENETICS AND EVOLUTION

Time: 3 hrs

Max. Marks: 75

I. Answer any FIVE of the following:

5x5=25

Draw labeled diagrams wherever necessary

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

II. Answer any FIVE of the following:

5x10=50

Draw labeled diagrams wherever necessary

9.

OR

10.

OR

11.

OR

12.

OR

13.

OR

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ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER

ZOOLOGY - PAPER - III

CYTOLOGY, GENETICS AND EVOLUTION

Periods: 24

Max. Marks: 50

I. Cytology

1. Preparation of temporary slides of Mitotic divisions with onion root tips
2. Observation of various stages of Mitosis and Meiosis with prepared slides
3. Mounting of salivary gland chromosomes of *Chironomous*

II. Genetics

1. Study of Mendelian inheritance using suitable examples
2. Study of linkage recombination, gene mapping using the data
3. Study of human karyotypes

III. Evolution

1. Study of fossil evidences
2. Study of homology and analogy from suitable specimens and pictures
3. Phylogeny of horse with pictures
4. Darwin's finches (pictures)
5. Visit to natural history museum and submission of report

ZOOLOGY SYLLABUS FOR IV SEMESTER

ZOOLOGY - PAPER - IV

EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY

Periods: 48

Max. Marks: 75

Unit - I

1.1 Developmental Biology and Embryology

1.1.1 Gametogenesis

1.1.2 Fertilization

1.1.3 Types of eggs

1.1.4 Types of cleavages

1.2 Development of Frog up to formation of primary germ layers

1.3 Formation and functions of Foetal membrane in chick embryo

1.4 Development, types and functions of Placenta in mammals

Unit - II

2.1 Physiology - I

2.1.1 Elementary study of digestive process

2.1.2 Absorption of digested food

2.1.3 Respiration - Pulmonary ventilation, transport of oxygen and carbon dioxide

2.1.4 Circulation - Structure and functioning of heart, Cardiac cycle

2.1.5 Excretion - Structure of nephron, urine formation, counter current mechanism

Unit - III

3.1 Physiology - II

3.1.1 Nerve impulse transmission - Resting membrane potential, origin and propagation of action potentials along myelinated and non myelinated nerve fibres

3.1.2 Muscle contraction - Ultra structure of muscle fibre, molecular and chemical basis of muscle contraction

3.1.3 Endocrine glands - Structure, secretions and the functions (of hormones) of pituitary, thyroid, parathyroid, adrenal glands and pancreas

3.1.4 Hormonal control of reproduction in a mammal

Unit - IV

4.1 Ecology - I

4.1.1 Meaning and scope of Ecology

4.1.2 Important abiotic factors of Ecosystem - Temperature, light, water, oxygen and CO₂

4.1.3 Nutrient cycles - Nitrogen, carbon and phosphorus

4.1.4 Components of Ecosystem (Example: lake), food chains and food web, energy flow in ecosystem

Unit - V

5.1 Ecology - II

5.1.1 Habitat and ecological niche

5.1.2 Community interactions - Mutualism, commensalism, parasitism, competition, predation

5.1.3 Ecological succession

5.1.4 Population studies

5.2 Zoogeography

5.2.1 Zoogeographical regions

5.2.2 Study of physical and faunal peculiarities of Oriental, Australian and Ethiopian regions

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ZOOLOGY MODEL PAPER FOR IV SEMESTER

ZOOLOGY - PAPER - IV

EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY

Time: 3 hrs

Max. Marks: 75

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ZOOLOGY PRACTICAL SYLLABUS FOR IV SEMESTER

ZOOLOGY - PAPER - IV

EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY

Periods: 24

Max. Marks: 50

I. Embryology

1. Study of T.S. of testis, ovary of a mammal
2. Study of different stages of cleavages (2, 4, 8 cell stages)
3. Study of chick embryo of 18 hours, 24 hours, 33 hours and 48 hours of incubation

II. Physiology

1. Qualitative tests for identification of carbohydrates, proteins and fats
2. Qualitative tests for identification of ammonia, urea and uric acid
3. Study of activity of salivary amylase under optimum conditions
4. Study of prepared slides of T.S. of duodenum, liver, lung, kidney, spinal cord, bone and cartilage

III. Ecology

1. Determination of pH of given sample
2. Estimation of dissolved oxygen of given sample
3. Estimation of total alkalinity of given sample
4. Estimation of salinity of given sample

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