

# Solapur University, Solapur

## SYLLABUS FOR B.Sc. II - ZOOLOGY

**PAPER III** - Animal Diversity III, Cell Science ,Genetics & Biological chemistry.

**PAPER IV** - Animal Diversity IV, Histology & Physiology.

### Detailed Syllabus for B.Sc. II

**PAPER III- Animal Diversity III, Cell science Genetics & Biological Chemistry.**

#### Section I Animal

#### Diversity III

- |                                                                                                                                                        |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 1. Salient features and Classification up to classes of the following with suitable examples.<br>Arthropoda, Mollusca, Echinodermata and Hemichordata. | 4  |
| 2. Arthropoda-Type study- Cockroach.                                                                                                                   | 16 |
| i. Systematic Position                                                                                                                                 |    |
| ii. Habits and Habitat                                                                                                                                 |    |
| iii. External Morphology                                                                                                                               |    |
| iv. Study of the following systems:                                                                                                                    |    |
| a. Digestive system.                                                                                                                                   |    |
| b. Respiratory system.                                                                                                                                 |    |
| c. Circulatory system.                                                                                                                                 |    |
| d. Nervous system and Compound Eye.                                                                                                                    |    |
| e. Excretory system.                                                                                                                                   |    |
| f. Reproductive system.                                                                                                                                |    |
| g. Sense organs with reference to ommatidia, mosaic vision                                                                                             |    |
| 3. Mollusca –Type study – Pila                                                                                                                         | 15 |
| i. Systematic Position                                                                                                                                 |    |
| ii. Habits and Habitat                                                                                                                                 |    |
| iii. External Morphology: Shell ii. Pallial Complex.                                                                                                   |    |
| iv. Economic importance of Pila                                                                                                                        |    |
| Study of following systems:                                                                                                                            |    |
| a. Digestive system                                                                                                                                    |    |
| b. Respiratory system                                                                                                                                  |    |
| c. Blood vascular system                                                                                                                               |    |
| d. Nervous system and Sense organs- Eye, Osphradium, Statocyst.                                                                                        |    |
| e. Excretory system                                                                                                                                    |    |
| f. Reproductive system                                                                                                                                 |    |
| 4. Study of the following General Topics:                                                                                                              |    |
| i. Insect Mouth parts –Cockroach, Honey bee, House fly, Butterfly, Mosquito                                                                            | 4  |
| ii. Mosquito insect vector in human diseases with reference to Malaria, Filaria and Dengue : Prevention, control measures and Treatment expected       | 2  |
| iii. Foot in Mollusca.                                                                                                                                 | 2  |
| iv. Affinities of Hemichordata                                                                                                                         | 2  |

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Total 45

## Section II (Cell science Genetics and Biological Chemistry)

1.	Cell division: Mitosis and Meiosis	5
2.	Linkage : complete and incomplete and its significance Crossing over: Mechanism ,cytological evidence , significance of crossing over	6
3.	Interaction of Genes: i. Supplementary genes. ii Complementary genes.	4
4.	Lethal Genes: Fully lethal genes and Semi lethal genes with suitable examples	3
5.	Sex Determination: i. Sex Chromosomes. ii Chromosomal Theory. iii. Genic balance theory iii. Gynandromorphs	6
6.	pH and Buffers: i. Water- Properties, Dissociation and Significance. ii. pH- Definition, Henderson-Hasselbalch Equation. iii. Buffers- Definition and Buffers in Biological Systems.	5
7.	Biomolecules and their Significance i. Carbohydrates, Proteins and Lipids: ii. Nucleic Acids: DNA- Structure and Biological Significance. RNA- Structure, Types and Biological Significance	11
8.	Enzymes i. Classification (Outline). ii. Characteristics of enzymes. iii. Mechanism of enzyme action with suitable example. iv. Factors controlling enzyme action.	5
Total		45

### List of Reference Books:

1. Arthropoda, Mollusca and Echinodermata: Kotpal, R.L.
2. Mollusca: Mortan, J.E.
3. Echinodermata: Nichols, D.
4. Invertebrate Zoology: Barnes.
5. Biology of Higher Invertebrates: Russel-Hunter.
6. Invetebrate Zoology: Jordan, E.L. and Verma, P.S.
7. The Text-Book of Invertebrate Zoology: Agarwal, V.P. and Dalela, R.C.
8. Invertebrates: Kotpal, R.C.
9. A Textbook of Invertebrate Zoology: Srivastava, M.
10. Cell and Molecular Biology : de Robertis.
11. Genetics: M.W. Strickberger, New York.
12. Principles of genetics: Sinnott, Dunn and Dobzhansky.
13. Principles of genetics: Edidon Gardner.
14. Molecular Biology of the Cell: Alberts, Bray/Raff/Roberts and Watson.
15. The Molecular Biology of the Gene: J.D. Watson.

16. Cell Biology: C.B.Powar.
17. Biochemistry: Lehninger, A.L.
18. Biochemistry: Das.
19. Biochemistry Vol.I: Dasgupta, S.K.
20. Biochemistry Voet and Voet
21. Textbook of Biochemistry: Rao, K.R.
22. Textbook of Biochemistry: West, E.S., Todd, W.R., Mason, H.S. and Van Bruggen, J.T.
23. Molecular Biology: Gupta, P. K.
24. Genetics: Gupta, P. K.

**PAPER IV: ANIMAL DIVERSITY IV, HISTOLOGY AND PHYSIOLOGY.**

**SECTION-I (Animal**

**Diversity -IV)**

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|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| 1. | Salient features and Classification of Reptiles, Birds and Mammals up to orders with suitable examples.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 5                                                    |
| 2. | Type Study- Rat <ol style="list-style-type: none"> <li>i. Systematic Position.</li> <li>ii. Habits and Habitat.</li> <li>iii. External Morphology</li> <li>iv. Study of following Systems:           <ol style="list-style-type: none"> <li>a. Digestive System.</li> <li>b. Respiratory System.</li> <li>c. Circulatory System.</li> <li>d. Excretory System.</li> <li>e. Nervous System- Brain and Spinal cord.</li> <li>f. Sense Organs- Eye and Ear.</li> <li>g. Reproductive System.</li> </ol> </li> </ol>                                                                                                                                                                              | 18                                                   |
| 3. | Study of the following General Topics: <ol style="list-style-type: none"> <li>i. Mesozoic reptiles</li> <li>ii. Poisonous and non-poisonous snakes.           <ol style="list-style-type: none"> <li>a. Identification features</li> <li>b. Poison Apparatus.</li> <li>c. Venom, Antivenin Production, Effects of Venom and its medicinal uses</li> <li>d. Snake bite and First Aid Treatment.</li> </ol> </li> <li>iii. Archaeopteryx.</li> <li>iv . Aerial Adaptations in Birds.</li> <li>v. Beak and Leg modifications in Birds.</li> <li>vi Migration in Birds.</li> <li>vii Salient features and affinities of Monotremes and Marsupials.</li> <li>viii. Dentition in mammals</li> </ol> | <br>2<br><br>4<br><br>2<br>3<br>4<br>2<br><br>2<br>2 |

Total = 45



**B.Sc.Part-II Zoology PRACTICAL-I**

1. Classification with Morphological peculiarities of the following up to classes.
  - i. Arthropoda- Apus, Balanus, Prawn, Lobster, King crab, Grasshopper, Butterfly, Moth, Millipede, Centipede, Scorpion, Spider, Peripatus.
  - ii. Mollusca- Chiton, Dentalium, Patella, Aplysia, Snail, Slug, Mytilus, Pearl Oyster, Sepia, Octopus.
  - iii. Echinodermata- Sea-lily, Brittle-star, Sea star, Sea-urchin, Sea-cucumber.
  - iv. Hemichordata- Balanoglossus.
2. Cockroach:
  - A. External Characters and Sexual Dimorphism.
  - B. Dissection of the following Systems:
    - i. Digestive System.
    - ii. Nervous System.
    - iii. Male Reproductive System.
    - iv. Female Reproductive System. Temporary
  - C. Temporary Preparation of the following:
    - i. Walking Leg,
    - ii. Mouth Parts.
    - iii. Thoracic Spiracles
    - iv. Salivary gland
    - v. Gizzard
    - vii. Gonapophyses
    - viii. Cornea
3. Pila: A. External Characters – Shell , Pallial complex
  - B. Dissection
    - i. Digestive System.
    - ii. Nervous System.
    - iii. Demonstration practical Heart
  - C. Temporary Preparation of the Following:
    - i. Osphradium.
    - ii. Radula.
    - iii. Statocyst.
4. Study of Mouth Parts of Honey Bee, Mosquito, Butterfly, Housefly
5. Mosquito as disease vector : Whole mounts of Anopheles, Culex and Aedis mosquito
6. Study of Foot in Mollusca: With reference to Chiton, Pila, Mytilus, Unio, Sepia/Octopus
7. Study of Mitosis with root tip chromosomes.
- 8 Examples in Genetics (at least 10 examples). Examples -based on Crossing over, Linkage, Interaction of genes .
9. Detection of Carbohydrates (Glucose, Fructose, Maltose/ Lactose, Starch), Proteins and Lipids.
10. Demonstration of enzyme action:
  - a) Urea-urease reaction any suitable material
  - b) Effect of temperature on enzyme action
  - c) action of papain on proteins

**B.Sc.Part-II Zoology PRACTICAL-II**

1. Classification with Morphological Peculiarities of the following upto Orders:
  - i. Reptilia- Turtle, Tortoise, Chameleon, Garden lizard  
Crocodile.
  - iii. Aves- Duck, Kite, Woodpecker, Sparrow, Sunbird,  
Vulture, Kingfisher, Fowl. Owl
  - iii. Mammals- Platypus, Bat, Scaly ant eater, Loris, Rabbit,Rat  
. (In case of non-availability of specimen  
Models/Photographs/Sketches can be used)
2. Rat: (Demonstration Practical)
  - a. Study of the following Systems:
    - i. Digestive System.
    - ii. Respiratory System.
    - iii. Arterial System.
    - iv. Venous System.
    - v. Excretory System.
    - vi. Reproductive Systems.
3. Dissection of Brain of Rat/Bird.
4. Temporary stained preparation of the following:
  - i. Blood of mammal.
  - ii. Pecten of bird.
  - iii. Sclerotic Plate of bird
  - iv. Collumella of bird.
  - v. Hyoid Apparatus of bird.
5. Study of Mesozoic Reptiles.(By Models/Charts).
6. Identification of the following Poisonous and Non-Poisonous snakes.  
Cobra, Russell's viper, *Echis carinata*- Indian little viper (*Phoorse*), Krait, Sea snake, Rat snake, Sand boa
7. Beak and Leg modifications with reference to:  
Parrot, Woodpecker, Kingfisher, Heron, Duck, Sparrow/Pigeon, Hawk/Kite, Owl. Vulture
8. Dentition in Mammals:  
Rabbit, Sheep, Rat/Rabbit . Dog, Man.
9. Study of histological structure of following mammalian organs:
  - i. Tooth (V.S.)      ii. Salivary Gland.      iii. Esophagus      iv Stomach,
  - v. Ileum      vi Rectum.      vii. Liver      viii Pancreas      ix. Kidney      x Testis      xi Ovary
  - xii Uterus      xiii Pituitary gland      iv T.S. Spinal cord
10. Study of the Enzyme action of Salivary Amylase.
11. Study of Rat sperm and vaginal smear
12. Study of following abnormal urine constituents: glucose, bile, blood, albumin
13. Study of Blood group antigens
14. Study of following contraceptives : Oral contraceptive pills, Intrauterine device, Condom

**Study Tour** : As a part of practical Visit to Sea-shore/any Suitable Place of Zoological interest to study animal diversity. Six day study tour is recommended A report is to be submitted at the time of examination.

### **Distribution of Marks for Practical Examination:**

#### **Practical- I**

1. Dissection- .....	10
2. Temporary Preparation/Mounting .....	5
3. Cytological preparation with Root tip chromosomes .....	6
4. Genetics Example .....	8
5. Biochemical tests / Enzyme action .....	6
6. Identification .....	10
7. Journal .....	5

Total 50

#### **Practical- II**

1. Dissection- .....	10
2. Temporary Preparation/Mounting .....	5
3. Physiological Experiment-/ Abnormal constituents of Urine .....	6
4. Examination of vaginal smear/sperm smear/ Blood group antigens/Salivary amylase .....	6
5. Submission of Excursion Report and Viva-voce based on it.....	8
6. Identification .....	10
7. Journal.....	5

Total 50

