



# SOLAPUR UNIVERSITY, SOLAPUR

Draft Syllabus for B.Sc. II Zoology  
Syllabus to be implemented from June 2014 onwards

## SEMESTER- III THEORY

Paper	Title of the paper	Marks
V	Animal Diversity III	50
VI	Cell Science, Genetics, Biological Chemistry and Economic Zoology	50

## SEMESTER- IV THEORY

Paper	Title of the paper	Marks
VII	Animal Diversity IV	50
VIII	Histology and Physiology	50

## PRACTICAL TO BE TAKEN AT THE END OF SEMESTER-IV

Practical	Title of the practical	Marks
I	Practical Based on Theory Papers V, VI, VII and VIII	100

# SOLAPUR UNIVERSITY, SOLAPUR

SYLABUS B.Sc. II ZOOLOGY W.E.F. from June 2014

## SEMESTER –III

### Paper – V Animal Diversity III

#### Unit No. I

**Taxonomy:** Salient features and Classification up to classes of the following with suitable examples: Arthropoda, Mollusca, Echinodermata and Hemichordata [5]

#### Unit No. II

**Type Study – 1.** Cockroach (Phylum- Arthropoda)

- i) Systematic Position
  - ii) Habits and Habitats
  - iii) External Morphology
  - iv) Economic importance
  - v) 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 systems
- [15]

#### Unit No. III

**Type Study – 2.** *Pila* (Phylum- Mollusca)

- i) Systematic position
  - ii) Habits and Habitats
  - iii) External morphology: Shell and Pallial Complex
  - iv) Economic Importance
  - v) 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 systems
- [15]

#### Unit No. IV

Study of Insect mouth parts: (Cockroach, Honeybee, House fly, Butterfly and Mosquito) and Mosquito as insect vector in human diseases with reference to: Malaria, Filariasis, and Dengue disease (Prevention, Control measures and Treatment expected). [5]

#### Unit No. V

Study of Foot in Mollusca and Affinities in Hemichordata [5]

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**TOTAL: 45**

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**List of Recommended Books:**

1. Arthropoda, Mollusca and Echinodermata – Kotpal. R.L. ( Series)
2. Mollusca – Morten. J.E.
3. Echinodermata – Nichols D.
4. Invertebrate – Kotpal .R.C.
5. Invertebrate Zoology – Jordan E.L. and Verma.P.S
6. Biology of Invertebrates – Russel-Hunter
7. The Text Book of Invertebrate Zoology - Shrivastava

**Semester III Paper VI**

**Cell Science, Genetics, Biological Chemistry and Economic Zoology**

**Unit No. I**

**Cell Science-** Study of Cell division: Mitosis and meiosis and Specialized cells (Structure, types and functions):i) Nerve cell, ii) Muscle cell, iii) Leucocyte (WBC) [5]

**Unit No. II**

**Genetics-Linkage:** i) Complete linkage with example  
ii) Incomplete linkage with example  
iii) Significance of linkage  
iv) Linkage phases: Coupling and repulsion (Example is not essential)

**Crossing over:** Mechanism and significance

**Interaction of genes:**

- i) Supplementary genes
- ii) Complementary genes [5]

**Unit No. III**

**Biological Chemistry-**

Biomolecules –(Definition, Structure, Types and Biological significance):

- i) Carbohydrates,
- ii) Proteins
- iii) Lipids
- iv) Nucleic Acids (DNA and RNA) [5]

**Unit No. IV**

**Economic Zoology-**

**1) Economic Fishery**

- i) Food value of fishes
- ii) Freshwater Fish farming – Construction and Maintenance.
- iii) Maintenance of glass Aquarium and Ornamental fishes. [5]

**2) Sericulture**

- i) Types of Silk moth
- ii) Morphology of mulberry silk moth
- iii) Life cycle
- iv) Rearing of silkworm
- vii) Economic importance. [5]

**3) Apiculture**

- i) Types and castes
- ii) Honey comb
- iii) Bee keeping
- iv) Economic importance. [5]

**4) Dairy Science**

- i) Breeds
- ii) Feeding
- iii) Housing

iv) Economic importance- Milk and Milk Products. [5]

**5) Poultry Science:**

i) Poultry breeds

ii) Feeding

iii) Housing

iv) Management

v) Food value- egg and poultry meat.

vi) Poultry diseases – Small pox and Ranikhet. [5]

**Unit No. V**

**Goat Farming**

i) Breeds

ii) Feeding

iii) Housing

iv) Economic importance. [5]

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**Total- 45**

**List of Recommended Books:**

1. The Cell – Bruce Albert
2. The Cell - De Robertis
3. Cell biology – C.B. Powar
4. The cell - Cooper
5. Biochemistry – Lehninger A.L.
6. Biochemistry - Das
7. Biochemistry Vol I – Dasgupta. S. K
8. Biochemistry – Voet and Voet
9. Biochemistry – Stryer
10. Molecular biology – Gupta .P.K
11. Principles of Genetics - Gardner
12. Genetics - Strickberger
13. Cell biology, Genetics, Evolution – Verma Agrawal
14. Molecular Biology of the Gene – Watson J.D.
15. Fish Culture – K.H.Alikuhni
16. Fish Culture – Lagler
17. Hand Book of Animal Husbandary and Dairy – Mudlyer.,
18. Bee keeping in India – Sardar Sing.
19. Bee Keeping in India- M. G. Smith.
20. Poultry keeping in India – Naidu P.N.M.
21. Poultry Husbandary – M. A. Jule.
22. Introduction to sericulture – Ganga and Shetty

**SEMESTER –IV    Paper –VII    Animal Diversity –IV**

**Unit No. I**

**Taxonomy:** Salient features and classification of Reptiles, birds and mammals up to orders with suitable examples. [5]

**Unit No. II**

**Type study:** 1. Rat

- i) Systematic position
- ii) Habits and Habitat
- iii) External Morphology
- iv) Study of following systems:
  - a) Digestive system
  - b) Respiratory system
  - c) Circulatory system
  - d) Excretory system
  - e) Nervous system- Brain and Spinal cord
  - f) Sense Organs- Eye and Ear
  - g) Reproductive systems (Male and female)

[20]

**Unit No. III Study of general topics:**

**A.Mesozoic reptiles:**

- a) Aquatic: Ichthyosaur and Plesiosaur
- b) Terrestrial: Pterosaur, Herbivorous dinosaur and Carnivorous dinosaur

**B.Salient features and affinities:** Monotremes and Marsupials

**C.Dentition in mammals:** Introduction, Herbivorous (Rabbit), Carnivorous (Dog) and Omnivorous (Human) [10]

**Unit No. IV**

**Poisonous and non-poisonous snakes:**

- a) Identification features with example
- b) Poison apparatus
- c) Venom and its medicinal uses.
- d) Antivenom production
- e) Effects of venom
- f) First aid treatment of Snake bite

[5]

**Unit No. V**

- i) Archaeopteryx.
- ii) Aerial adaptations in birds
- iii) Beak and Leg modifications in birds
- iv) Migration in Birds

[5]

**Total periods: [45]**

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**List of Recommended Books:**

- 1) Rat : Rowett
- 2) Rat : Kshirsagar. G.R.
- 3) T.B. of vertebrate Zoology – Prasad.S.N.I
- 4) Vertebrates – Kotapal.R.C
- 5) Comparative vertebrate anatomy- Hyman.L.H.

Semester IV Paper VIII Histology and Physiology

**Unit No. I**

**Study of Tissues**

(Review of following tissues with reference to origin, location and functions)

- i) Epithelial ii) Connective iii) Muscular iv) Nervous [5]

**Unit No. II**

**Histology of following mammalian organs**

- i) Tooth ii) Salivary gland iii) Oesophagus iv) Stomach  
v) Ileum vi) Rectum vii) Liver viii) Pancreas  
ix) Kidney x) Spinal cord xi) Testis xii) Ovary  
xiii) Uterus xiv) Pituitary gland [15]

**Unit No. III**

**Reproductive physiology:**

- i) Hormones of pituitary  
ii) Sex hormones  
iii) Oestrous cycle  
iv) Menstrual cycle  
v) Hormonal control of pregnancy, parturition and lactation  
vi) Hormonal control of testicular activity  
vii) In-vitro fertilization  
viii) Amniocentesis [10]

**Unit No. IV**

**Study of Contraceptives**

[5]

**Unit No. V**

**Body defense mechanism-**

A) Immune system

- i) Humoral immunity and its mechanism  
a) B-Cell Immunity  
b) Structure and types of antibodies  
ii) Cellular immunity and its mechanism  
a) Types of T-Cell  
b) T-Cell Immunity

B) Organs involved in immune system

- a) Bone marrow  
b) Lymphatic nodes [10]

**Total Periods:[45]**

**List of Recommended Books:**

- 1) Histology – Ham.A.W.
- 2) Baileys's T.B. of Histology – Williams and Williams
- 3) An Atlas of Histology – Heineman Educational Book Ltd. London
- 4) Microscopic anatomy of vertebrates – Lea and Febigen, Philadelphia.
- 5) Histology of Mammals – Atavale M.V. and Latey A.N.
- 6) Human physiology by Chatterjee.C.C.
- 7) Physiology – A.C. Guyton

**Practical Course in Zoology for B. Sc. II**  
**Semester III and IV**  
**[ To be taken at the end of Semester IV ]**  
**PRACTICAL – I**

**I. Taxonomy-**

Classification with morphological peculiarities of the following up to classes.

- a) Arthropoda – Apus, Balanus, Prawn, Lobster, King-crab, Grasshopper, Butterfly  
Moth, Millepede, Centipede, Scorpion, Spider, Peripatus
- b) Mollusca – Chiton, Dentalium, Patella, Aplysia, Snail, Slug, Mytilus, Pearl  
Oyster, Sepia, Octopus
- c) Echinodermata – Sea-star, Brittle star, Sea-lily, sea urchin, sea cucumber
- d) Hemichordata - Balanoglossus

**II. Study of 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
- c) Temporary preparation of the following
  - i) Walking leg
  - ii) Mouth parts
  - iii) Thoracic spiracles
  - iv) Salivary apparatus
  - v) Gizzard
  - vi) Cornea
  - vii) Trachea

**III. Study of Pila-**

- A) External characters – Shell, Pallial complex
- B) Dissections :
  - i) Digestive system
  - ii) Nervous system
- C) Temporary preparation of the following:
  - i) Osphradium
  - ii) Radula
  - iii) Statocyst

IV. Study of mouth parts of : Honey bee, Mosquito, Butterfly, Housefly

V. Mosquito as disease vector : Whole mounts of Anopheles, Culex, Aedis

VI. Study of foot in mollusca with reference to Chiton, Pila, Mytilus, Unio, Sepia/  
Octopus

VII. Study of mitosis with root tip chromosomes

VIII. Differential count of WBCs.

IX. Examples in genetics ( at least 10 examples) : Examples based on Crossing over,  
Linkage and interaction of genes

X. Detection of Carbohydrates ( Glucose, Fructose, Maltose/Lactose, Starch), Proteins  
and Lipids.

XI. Glass aquarium fishes (Any five fishes)

XII. Apiculture – Kinds and castes of Bees, Honeycomb, Honey, Bee wax

XIII. Sericulture - Study of silk moth, silk cocoons, and silk.

XIV. Dairy Science – Study of Milk and Milk products.

XV. Poultry Science – Different kinds of Poultry birds, Eggs, and Poultry manure.

## PRACTICAL – II

### I. Taxonomy-

Classification with morphological peculiarities of the following up to Orders :

- i) Reptiles – Turtle, Tortoise, Chamaeleon, Garden lizard, Crocodile
- ii) Aves – Duck, Kite, Woodpecker, Sparrow, Sunbird, Vulture, Kingfisher  
Fowl,
- iii) Mammals – Platypus, Bat, Scaly ant eater, Loris, Rabbit (models / photographs/ sketches can be used)

### II. Study of Rat : (Demonstration practical)-

Study of the following system :

- i) Digestive system
- ii) Respiratory system
- iii) Arterial system
- iv) Venous system
- v) Excretory system
- vi) Reproductive systems (Male and female)

### III. Dissection of Brain of Bird

### IV. Temporary stained preparation of the following:

- i) Blood of mammal
- ii) Pecten of bird
- iii) Sclerotic plate of bird
- iv) Collumela of bird
- v) Hyoid apparatus of bird

### V. Study of Mesozoic reptiles (use charts / models)-

### VI. Identification of the following poisonous and non poisonous snakes :

- i) Cobra
- ii) Russel's Viper
- iii) Indian little Viper ( Phoorsa)
- iv) Krait
- v) Sea snake
- vi) Rat snake
- vii) Sand boa

### VII. Beak and leg modifications with reference to :

- i) Parrot
- ii) Woodpecker
- iii) Heron
- iv) Duck
- v) Sparrow / Pigeon
- vi) Hawk / Kite
- vii) Owl
- viii) Vulture

### VIII. Dentition in mammals : Sheep, Rat / Rabbit, Dog , Man

### IX. Study of histological structure of the following organs :

- i) Tooth (V.S.)
- ii) Salivary gland
- iii) Oesophagus
- iv) Stomach
- v) Ileum
- vi) Rectum
- vii) Liver
- viii) Pancreas
- ix) Kidney
- x) Testis
- xi) Ovary
- xii) Uterus
- xiii) Pituitary gland
- xiv) T.S. Spinal cord

### X. Study of rat sperm and vaginal smear

**XI. Study of following abnormal urine constituents :** Glucose, Bile, Blood and Albumin

**XII. Study of ABO blood group system and blood group antigens**

**XIII. Study of following contraceptives :** Oral contraceptives pills, Intra-uterine device, Condom

### Study or Excursion Tour :

As a part of practical visit to sea –shore / any suitable place of zoological interest to study animal diversity and Economic Zoology. Six days tour is recommended. A report is to be submitted at the time of Practical examination.



# **Solapur University, Solapur**

## **Nature of Question Paper For Semester Pattern**

### **• Faculty of Science**

**(w.e.f. June 2011)**



**- 2 hrs.**

**Total Marks-50**

**Q. No.1) Multiple choice questions. (10)**

1) -----

a)      b)      c)      d)

2)

3)

4)

5)

6)

7)

8)

9)

10)

**Q.No.2) Answer any Five of the following (10)**

i)

ii)

iii)

iv)

v)

vi)

**Q.No.3) A) Answer any Two of the following (06)**

i)

ii)

iii)

**B) Write the Answer/Solve/Problem/Note**

**(04)**

**Q.No.4) Answer any Two of the following (10)**

i)

ii)

iii)

**Q.No.5) Answer any One of the following (10)**

i)

ii)

**Distribution of Marks for Practical Examination.**

**PRACTICAL I :**

Q.1. Dissection	Marks 10
Q.2. Temporary preparation / Mounting	Marks 05
Q.3. Cytological preparation	Marks 06
Q.4. Genetics example	Marks 08
Q.5. Biochemical tests	Marks 06
Q.6. Identification / Spotting	Marks 10
Q.7. Journal ( Practical Record Book)	Marks 05
	Total Marks [50]

**PRACTICAL II :**

Q.1. Dissection	Marks 10
Q.2. Temporary preparation / Mounting	Marks 05
Q.3. Physiological experiment / Abnormal constituent of urine	Marks 06
Q.4. Examination of vaginal smear / Sperm smear / Blood group Antigens	Marks 08
Q.5. Submission of excursion report and viva based on it	Marks 06
Q.6. Identification / Spotting	Marks 10
Q.7. Journal ( Practical Record Book)	Marks 05
	Total Marks [50]

### 1. Structure of the courses :-

- A) Each paper of every subject for Arts, Social Sciences and Commerce Faculty shall be of 50 marks as resolved by the respective faculties and Academic Council.
- B) For Science Faculty subjects each paper shall be of 50 marks and practical for every subject shall be of 50 Marks as resolved in the faculty and Academic Council.
- C) For B. Pharmacy also the paper shall be of 50 marks for University examination. Internal marks will be given in the form of grades.
- D) For courses which were in semester pattern will have their original distribution already of marks for each paper.
- E) For the faculties of Education, Law, Engineering the course structure shall be as per the resolutions of the respective faculties and Academic Council.

### 2. Nature of question paper:

#### A) Nature of questions.

“20% Marks - objectives question” **(One mark each and multiple choice questions)**

“40% Marks - Short notes / Short answer type questions / Short Mathematical type questions/ Problems. **(2 to 5 Marks each)**

“40% Marks - Descriptive type questions / Long Mathematical type questions / Problems. **(6 to 10 Marks each)**

- B) Objective type question will be of multiple choice (MCQ) with four alternatives. This answer book will be collected in first 15 minutes for 10 marks and in first 30 minutes for 20 marks. Each objective question will carry one mark **each**.
  - C) Questions on any topic may be set in any type of question. All questions should be set in such a way that there should be permutation and combination of questions on all topics from the syllabus. As far as possible it should cover entire syllabus.
  - D) There will be only five questions in the question paper. All questions will be compulsory. There will be internal option **(30%)** and not overall option. **for questions 2 to 5.**
3. Practical Examination for B. Sc. I. will be conducted at the end of second semester.
  4. Examination fees for semester Examination will be decided in the Board of Examinations.

The structures of all courses in all Faculties were approved and placed before the Academic Council. After considered deliberations and discussion it was decided not to convene a meeting of the Academic Council for the same matter as there is no deviation from any decision taken by Faculties and Academic Council. Nature of Question Paper approved by Hon. Vice Chancellor on behalf of the Academic Council.

### Equivalence of Syllabus:

There is no equivalence for theory and practical of old and new course. The student should appear for theory and practical based on new course only.

