# Zoology

**B.Sc. ( I - IV Semesters ) Syllabus (CBCS)**

( w.e.f. 2016 - 2017 )

Faculty of Science

PALAMURU UNIVERSITY

Mahabubnagar - 509 001, Telangana

2016

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. I Year
I - SEMESTER
Discipline Specific Course, Paper – I
[Code: BS105; Course Type DSC 2A]
Animal Diversity – Invertebrates

Periods: 60 Max. Marks: 40

UNIT – I (15 Periods)

1.1 Brief history of Invertebrates
- 1.1.1 Kingdom Animalia
- 1.1.2 Brief history of Invertebrates

1.2 Protozoa
- 1.2.1 General characters
- 1.2.2 Classification up to classes with examples
- 1.2.3 Type study - *Elphidium*
- 1.2.4 Life cycle of *Plasmodium.*
- 1.2.5 Locomotion, Reproduction and Diseases

1.3 Porifera
- 1.3.1 General characters
- 1.3.2 Classification of Porifera up to classes with examples
- 1.3.3 Type study - *Sycon*
- 1.3.4 Canal system in sponges and Spicules.

UNIT – II (15 Periods)

2.1. Cnidaria
- 2.1.1 General characters
- 2.1.2 Classification of Cnidaria up to classes with examples
- 2.1.3 Type study - *Obelia*
- 2.1.4 Polymorphism in hydrozoa
- 2.1.5 Corals and coral reef formation

2.2 Platyhelminthes
- 2.1.1 General characters
- 2.1.2 Classification of Platyhelminthes up to classes with examples
- 2.1.3 Type study- *Schistosoma*

2.3 Nemathelminthes
- 2.3.1 General characters
- 2.3.2 Classification of Nemathelminthes up to classes with examples
- 2.3.3 Type study - *Dracunculus*
- 2.3.4 Parasitic Adaptations in Helminthes

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UNIT – III (15 Periods)

3.1 Annelida

- 3.1.1 General characters
- 3.1.2 Classification of Annelida up to classes with examples
- 3.1.3 Type study - *Hirudinaria granulosa.*
- 3.1.4 Evolutionary significance of Coelome and Coelomoducts and metamerism

3.2 Arthropoda

- 3.2.1 General characters
- 3.2.2 Classification of Arthropoda up to classes with examples
- 3.2.3 Type study - Prawn
- 3.2.4 Mouth parts of Insects
- 3.2.5 Insect metamorphosis
- 3.2.6 *Peripatus* - Structure and affinities

UNIT – IV (15 Periods)

4.1 Mollusca

- 4.1.1 General characters
- 4.1.2 Classification of Mollusca up to classes with examples
- 4.1.3 Type study - *Pila*
- 4.1.4 Pearl formation
- 4.1.5 Torsion and detorsion in gastropods

4.2 Echinodermata

- 4.2.1 General characters
- 4.2.2 Classification of Echinodermata up to classes with examples
- 4.2.3 Water vascular system in star fish
- 4.2.4 Echinoderm larvae and their significance

4.3 Hemichordata

- 4.3.1 General characters
- 4.3.2 Classification of Hemichordata up to classes with examples
- 4.3.3 *Balanoglossus* - Structure and affinities

Suggested Readings

1. L.H. Hyman '*The Invertebrates' Vol I, II and V*. – M.C. Graw Hill Company Ltd.
2. Kotpal, R.L. 1988 - 1992 Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
3. E.L. Jordan and P.S. Verma '*Invertebrate Zoology*' S. Chand and Company.
4. R.D. Barnes '*Invertebrate Zoology*' by: W.B. Saunders CO., 1986.
5. Barrington. E.J.W., '*Invertebrate structure and Function*' by ELBS.
6 P.S. Dhami and J.K. Dhami. Invertebrate Zoology. S. Chand and Co. New Delhi.
7. Parker, T.J. and Haswell '*A text book of Zoology*' by, W.A., Mac Millan Co. London.
8. Barnes, R.D. (1982). *Invertebrate Zoology,* V Edition"

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. I Year
ZOOLOGY PRACTICAL SYLLABUS FOR I SEMESTER
Discipline Specific Course, Paper – I
[Code: BS105; Course Type DSC 2A]
ANIMAL DIVERSITY - INVERTEBRATES

Periods: 30 Max. Marks: 40

1. Study of museum slides / specimens / models (Classification of animals up to orders)
   - i. Protozoa: Amoeba, *Paramoecium*, *Paramoecium Binary fission and Conjugation*, *Vorticella*, *Entamoeba histolytica*, *Plasmodium vivax*
   - ii. Porifera: *Sycon*, *Spongilla*, *Euspongia*, *Sycon* - T.S & L.S, Spicules, Gemmule
   - iii.
   - iv. Coelenterata: *Obelia – Colony & Medusa*, *Aurelia*, *Physalia*, *Velella*, *Corallium*, *Gorgonia*, *Pennatula*
   - v.
   - vi. Platyhelminthes: *Planaria*, *Fasciola hepatica*, *Fasciola* larval forms – Miracidium, Redia, Cercaria, *Echinococcus granulosus*, *Taenia solium*, *Schistosoma haematobium*
   - vii.
   - viii. Nemathelminthes: *Ascaris(Male & Female)*, *Drancunculus*, *Ancylostoma*, *Wuchereria*
   - ix.
   - x. Annelida: *Nereis*, *Aphrodite*, *Chaetopteurs*, *Hirudinaria*, Trochophore larva
   - xi.
   - xii. Arthropoda: Cancer, Palaemon, Scorpion, *Scolopendra*, *Sacculina*, *Limulus*, *Peripatus*, Larvae - Nauplius, Mysis, Zoea, Mouth parts of male & female *Anopheles* and *Culex*, Mouthparts of Housefly and Butterfly.
   - xiii.
   - xiv. Mollusca: *Chiton*, *Pila*, *Unio*, *Pteredo*, *Murex*, *Sepia*, *Loligo*, *Octopus*, *Nautilus*, Glochidium larva
   - xv.
   - xvi. Echinodermata: *Asterias*, *Ophiothrix*, *Echinus*, *Clypeaster*, *Cucumaria*, *Antedon*, Bipinnaria larva
   - xvii.
   - xviii. Hemichordata: *Balanoglossus*, Tornaria larva
   - xix.
2. Dissections:

   Prawn: Appendages, Digestive system, Nervous system, Mounting of Statocyst
   Insect Mouth Parts
3. Laboratory Record work shall be submitted at the time of practical examination
4. An "Animal album" containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.
5. Computer aided techniques should be adopted – show virtual dissections

Suggested manuals:

1. Practical Zoology- Invertebrates S.S. Lal
2. Practical Zoology - Invertebrates P.S. Verma
3. Practical Zoology - Invertebrates K.P. Kurl

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

## B.Sc. I Year
## ZOOLOGY PRACTICAL SYLLABUS FOR I SEMESTER
## Discipline Specific Course, Paper – I
## [Code: BS105; Course Type DSC 2A]
## ANIMAL DIVERSITY - INVERTEBRATES

Time: 2 Hrs. Max. Marks: 40

| | |
|---|---|
| 1. Identification, labeled diagram and salient features of spots: | 18 |
| (7 Museum specimens + 2 slides) | |
| 2. Dissection (one) (Diagram -02 + Dissection & Display-05) | 07 |
| 3. Field Visit & Note Book | 04 |
| 4. Project Work | 03 |
| 5. Certified practical record | 03 |
| 6. Animal Album | 03 |
| 7. Viva voce | 02 |

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. I Year
II - SEMESTER
Discipline Specific Course, Paper – II
[Code: BS205; Course Type DSC 2B]
Ecology, Zoogeography and Animal Behavior

Periods: 60 Max. Marks: 40

UNIT – I (15Periods)

1.1 Ecology - I

1.1.1 Ecosystem structure and functions.
1.1.2 Types of Ecosystems –Aquatic and Terrestrial.
1.1.3 Biogeochemical cycles - Nitrogen, Carbon, Phosphorus and Water.
1.1.4 Energy flow in ecosystem.
1.1.5 Food chain, food web and ecological pyramids.
1.1.6 Animal Associations - Mutualism, commensalism, parasitism, competition, predation.

UNIT – II (15 Periods)

2.1 Ecology – II

2.1.1 Concept of Species, Population dynamics and Growth curves.
2.1.2 Community Structure and dynamics and Ecological Succession.
2.1.3 Ecological Adaptations.
2.1.4 Environmental Pollution – Sources, Effect and Control measures of Air, Water, Soil and Noise pollution,
2.1.5 Wildlife conservation - National parks and Sanctuaries of India, Endangered species.
2.1.6. Biodiversity and hotspots of Biodiversity in India.

UNIT – III (15 Periods)

3.1 Zoogeography

3.1.1 Zoogeographical regions – Palaearctic, Nearctic, Neotropical, Oriental, Australian and Ethiopian regions - their Climatic and faunal peculiarities
3.1.2 Wallace line, Discontinuous distribution
3.1.3. Continental Drift

UNIT – IV (15 Periods)

4.1 Animal Behaviour

4.1.1 Types of Behaviour- Innate and Acquired, Instinctive and Motivated behaviour
4.1.2 Taxes, Reflexes, Tropisms
4.1.3 Physiology and phylogeny of learning, trial and error learning, Imprinting, habituation, Classical conditioning, Instrumental conditioning
4.1.5 Social behavior, Communication, Pheromones

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4.1.6 Biological rhythms, Biological clocks, Circadian rhythms

Suggested Readings

M.P.Arora, *'Ecology'* Himalaya Publishing company.
P.D.Sharma, *Environmental Biology'*.
P.R.Trivedi and Gurdeep Raj. *'Environmental Ecology'*
Buddhadev Sarma and Tej Kumar, *Indian Wildlife Threats and Preservation*
Chapman J.L. and Reiss M.J, *Ecology Principles and Applications,* Second Ed., Cambridge University Press, London.
Benny Joseph, *Environmental Studies*, TATA MGraw Hill Com., New Delhi.
Eugene P. Odum, *Fundamentals of Ecology* Third Ed., NataraJ Publishers, Dehradun.
Veer Bala Rastogi, "Ecology and Animal Distribution"
P.K. Gupta, "Text Book of Ecology and Environment"
Bhatnagar and Bansal, "Ecology and Wildlife biology
Dasmann, "Wild life Biology"
Reena Mathur, "Animal Behaviour"
Alocock, "Animal Behaviour- an Evolutionary Approach

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. I Year
B.Sc. PRACTICAL SYLLABUS FOR II SEMESTER
Discipline Specific Course, Paper – II
[Code: BS205; Course Type DSC 2B]
Ecology, Zoogeography and Animal Behavior

Periods: 30 Max. Marks: 40

1. Determination of pH of Soil and Water
2. Estimation of salinity (chlorides) of water in given samples.
3. Estimation of Carbonates and bicarbonates in the given water samples.
4. Estimation of dissolved oxygen of pond water, sewage water and effluents.
5. Identification of Zooplankton from a nearby water body.
6. Study of Pond Ecosystem / local polluted site - Report submission
7. Study of at least 3 endangered or threatened wild animals of India through photographs / specimens / models
8. Field visit to Zoo Park to study the management, behavior and enumeration of wild animals.
9. Identification of Zoogeographical realms from the Map and identify specific fauna of respective regions.
10. Observe the response of invertebrates in different lightening conditions

Computer aided techniques should be adopted as per UGC guide lines.

Suggested manuals

1. Robert Desharnais,Jeffrey Bell, 'Ecology Student Lab Manual, Biology Labs'
2. Darrell S Vodopich, 'Ecology Lab Manual'

B.Sc. ZOOLOGY SYLLABUS UNDER CBS

B.Sc. II Year
III - SEMESTER
Core Paper – III
Animal Diversity- Vertebrates and Developmental Biology

Periods: 60 Max. Marks: 80

UNIT – I (15 Periods)

1.1. Urochordata, Cephalochordata, Cyclostomata
- 1.1.1. Salient features of Urochordata
- 1.1.2. Retrogressive metamorphosis and its significance in Urochordata
- 1.1.3. Salient features and affinities of Cephalochordata
- 1.1.4. General characters of Cyclostomata
- 1.1.5. Comparison of the *Petromyzon* and *Myxine*
- 1.1.6. General characters and classification of Chordata upto orders with examples.

1.2. Pisces
- 1.2.1. General characters of Fishes
- 1.2.2. Classification of fishes up to order level with examples
- 1.2.3. *Scoliodon* – Respiratory, Circulatory and Nervous system.
- 1.2.4. Types of Scales and types of Fins

UNIT – II (15 Periods)

2.1. Amphibia
- 2.1.1. General characters of Amphibians
- 2.1.2. Classification of Amphibians up to orders with examples.
- 2.1.3. *Rana tigrina* - Respiratory, Circulatory and Nervous system.
- 2.1.4. Parental care in amphibian; neoteny and paedogenesis.

2.2 Reptilia
- 2.2.1. General characters of Reptilia
- 2.2.2. Classification of Reptilia up to orders with examples
- 2.2.3. *Calotes* – Respiratory system, Circulatory and Nervous system.
- 2.2.4. Temporal fosse in reptiles and its evolutionary importance
- 2.2.5. Distinguished characters of Poisonous and Non poisonous snakes.
- 2.2.6. Rhynchocephalia.

UNIT – III (15 Periods)

3.1. Aves
- 3.1.1. General characters of Aves
- 3.1.2. Classification of Aves up to orders with examples.
- 3.1.3. *Columba livia* -, Digestive system, Circulatory systems, Respiratory system and Nervous system.
- 3.1.4. Migration in Birds
- 3.1.5. Flight adaptation in Birds

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3.2. Mammalia

- 3.2.1. General characters of Mammalia
- 3.2.2. Classification of Mammalia up to orders with examples
- 3.2.3. Rabbit –Digestive, Respiratory, Circulatory and Nervous system.
- 3.2.4. Dentition in mammals.
- 3.2.5. Aquatic adaptations in Mammals.

UNIT – IV (15 Periods)

4.1 Developmental Biology and Embryology

- 4.1.1 Gametogenesis (Spermatogenesis and Oogenesis)
- 4.1.2 Fertilization
- 4.1.3 Types of eggs
- 4.1.4 Types of cleavages
- 4.1.5 Development of Frog up to formation of primary germ layers
- 4.1.6 Formation of Foetal membrane in chick embryo and their functions
- 4.1.7 Types and functions of Placenta in mammals
- 4.1.8 Regeneration in Turbellaria and Lizards

Suggested Readings:

1. E.L.Jordan and P.S. Verma '*Chordate Zoology*' -. S. Chand Publications.
2. Mohan P.Arora. '*Chordata – I*, Himalaya Publishing House Pvt.Ltd.
3. Marshal, Parker and Haswell '*Text book of Vertebrates*'. ELBS and McMillan, England.
4. Alfred Sherwood Romer. Thomas S. Pearson '*The Vertebrate Body*, Sixth edition, CBS college Publishing, Saunders College Publishing
5. George C. Kent, Robert K. Carr. *Comparative Anatomy of the Vertebrates,* 9th ed. McGraw Hill.
6. Kenneth Kardong *Vertebrates: Comparative Anatomy*, *Function and Evolution,* 4th ed, 'McGraw Hill.
7. J.W. Young, *The Life of Vertebrates*, 3rd ed, Oxford University press.
8. Harvey Pough F, Christine M. Janis, B. Heiser, *Vertebrate Life*, Pearson, 6th ed, Pearson Education Inc.2002.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. II Year
ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER
ZOOLOGY - CORE PAPER - III
Animal Diversity- Vertebrates and Developmental Biology

Periods: 30 Max. Marks: 25

Study of museum slides / specimens / models (Classification of animals up to orders)

1. Protochordata: *Amphioxus*, *Amphioxus* T.S. through pharynx
2. Cyclostomata: *Petromyzon*, *Myxine*, *Ammocoetus larva*
3. Pisces: Sphyrna *Pristis*, *Torpedo*, *Channa*, *Pleuronectes*, *Hippocampus*, *Exocoetus*, *Echieneis*, *Labeo*, *Catla*, *Clarius*, *Auguilla*, *Protopterus*, Scales: Placoid, Cycloid, Ctenoid
4. Amphibia: *Ichthyophis*, *Amblystoma*, *Siren*, *Hyla*, *Rachophous*,*Bufo*,*Rana*, Axolotal larva
5. Reptilia : *Draco*, *Chemaeleon*, *Gecko*, *Uromastix*, *Vipera russelli*, *Naja*, *Bungarus*, *Enhydrina*, *Typhlops*, *Testudo*, *Trionyx*, *Crocodilus*, *Ptyas.*
6. Aves: Archaeopteryx, *Passer*, *Psittacula*, *Bubo*, *Alcedo*, *Columba*, *Corvus*, *Pavo;* Collection and study of different types of feathers: Quill, Contour, Filoplume, Down
7. Mammalia: *Ornithorhynchus*, *Tachyglossus*, *Pteropus*, *Funambulus*, *Manis*, *Loris*, Hedgehog

Histology: T.S. of Liver, Pancreas, Kidney, Stomach, Intestine, Lungs Artery, Vein, Bone T.S., Spinal cord.

Osteology :

1. Rabbit – Axial skeleton system (bones of Skull and Vertebral Column)
2. Varanus, Pigeon and Rabbit – Appendicular skeleton system (bones of limbs and girdles)

Dissections of *Labeo/Tilapia*:

1. Digestive system.
2. Brain, Weberian ossicles
3. V, VII, IX, X cranial nerves

Embryology

1. Study of T.S. of Testis and Ovary of a mammal
2. Study of different stages of cleavages (2, 4, 8, 16 cell stages); Morula, Blastula
3. Study of chick embryos of 18 hours, 24 hours, 33 hours and 48 hours of incubation

Laboratory Record work shall be submitted at the time of practical examination
An "Animal album" containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

Computer aided virtual dissections.

Suggested manuals

1. S.S.Lal, Practical Zoology – Vertebrata
2. P.S.Verma, A manual of Practical Zoology – Chordata
3. Freeman & Bracegirdle, An atlas of embryology

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. II Year
ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER
ZOOLOGY - CORE PAPER - III
Animal Diversity- Vertebrates and Developmental Biology

Time: 2 Hrs. Max. Marks: 25

| | |
|---|---|
| 1. Identification, labeled diagram and salient features of spots: (6 Museum specimens + 2 slides) | 08 |
| 2. Osteology (02 Spots) | 04 |
| 3. Dissection (one) (Diagram + Dissection & Display) | 05 |
| 4. Embryology (02 Spots) | 04 |
| 5. Certified practical record | 03 |
| 6. Animal Album | 02 |
| 7. Viva voce | 02 |

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. II Year
IV - SEMESTER
Core Paper – IV
Cell Biology, Genetics & Evolution

Periods: 60 Max. Marks: 80

UNIT – I (15 Periods)

1. Cell Biology
1.1. Cell theory, Differences of Prokaryotic and Eukaryotic cells
1.2. Ultrastructure of animal cell
1.3. Structure and functions of plasma membrane proteins.
1.4. Structure and functions of cell organelles –
Endoplasmic reticulum, Golgi body, Ribosomes, Lysosomes, centrosomes, Mitochondria and Nucleus
1.1.5 Chromosomes – Structure, types, giant chromosomes
1.1.6 Cell Division - Mitosis, Meiosis.
1.1.7. Cell cycle and its regulation.

UNIT – II (15 Periods)

2. Molecular Biology
2.1 DNA (Deoxyribo Nucleic Acid) - Structure
2.2 RNA (Ribo Nucleic Acid) - Structure, types
2.3 DNA Replication
2.4 Protein Synthesis – Transcription and Translation
2.5 Gene Expression – Genetic Code; operon concept
2.6 Molecular Biology Techniques- Polymerase Chain Reaction, Electrophoresis

UNIT – III (15 Periods)

3. Genetics
3.1 Mendals laws of Inheritance and Non-Medelian Inheritance
3.2 Linkage and Crossing over
3.3.Sex determination and sex-linked inheritance
3.4 Chromosomal Mutations- Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy.
3.5. Gene mutations- Induced versus Spontaneous mutations.
3.6. Inborn errors of metabolism.
3.7. One gene one enzyme, one gene one polypeptide theory.

UNIT – IV (15 Periods)

4. Evolution
4.1. Theories of evolution – Lamarckism and Neo-Lamarckism, Darwinism and Neo-Darwinism, Modern synthetic theory.
4.2. Evidences of Evolution and Hardy Weinberg Law.
4.3. Forces of Evolution – mutation, gene flow, genetic drift, and natural selection.
4.4. Isolation – Pre-mating and post mating isolating mechanisms
4.5. Speciation: Methods of speciation - Allopatric and sympatric
4.6. Causes and Role of Extinction in Evolution.

Suggested readings


1. Lodish, Berk, Zipursky, Matsudaria, Baltimore, Darnell *'Molecular Cell Biology'* W.H. Free man and company New York..
2. Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008). *Principles of Genetics*. VIII Edition. Wiley India.
3. Snustad, D.P., Simmons, M.J. (2009). *Principles of Genetics*. V Edition. John Wiley and Sons Inc.
4. Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). *Concepts of Genetics*. X Edition. Benjamin Cummings.
5. Russell, P. J. (2009). *Genetics- A Molecular Approach.* III Edition. Benjamin Cummings.
6. Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B. *Introduction to Genetic Analysis*. IX Edition. W. H. Freeman and Co.
7. Ridley, M. (2004). *Evolution*. III Edition. Blackwell Publishing
8. Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H. (2007). *Evolution*. Cold Spring, Harbour Laboratory Press.
9. Hall, B. K. and Hallgrimsson, B. (2008). *Evolution*. IV Edition. Jones and Bartlett Publishers
10. Campbell, N. A. and Reece J. B. (2011). *Biology*. IX Edition, Pearson, Benjamin, Cummings.
11. Douglas, J. Futuyma (1997). *Evolutionary Biology*. Sinauer Associates.
12. Minkoff, E. (1983). *Evolutionary Biology*. Addison-Wesley.
13. James D. Watson, Nancy H. Hopkins '*Molecular Biology of the Gene'*
14. Jan M. Savage. *Evolution,* 2nd ed, Oxford and IBH Publishing Co., New Delhi.
15. Gupta P.K., 'Genetics'

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. II Year
ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER
ZOOLOGY Core Paper – IV
Cell Biology, Genetics and Evolution

Periods: 30 Max. Marks: 25

I. Cytology
1. Preparation and Identification of slides of Mitotic divisions with onion root tips
2. Preparation and Identification of different stages of Meiosis in Grasshopper Testes
3. Identification and study of the following slides
   i). Different stages of Mitosis and Meiosis
   ii) Lamp brush and Polytene chromosomes

II. Genetics
1. Problems on Genetics - Mendelian inheritance, Linkage and crossing over, Sex linked inheritance

III. Evolution
1. Museum Study of Fossil animals: *Peripatus*, *Coelacanth Fish*, *Dipnoi fishes*, *Sphenodon*, *Archeopteryx*.
2. Study of homology and analogy from suitable specimens and pictures
3. Problems on Hardy-Weinberg Law
4. Macroevolution using Darwin finches (pictures)

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

An "Album" containing photographs, cut outs, with appropriate write-up about Genetics and Evolution.

Computer aided techniques should be adopted as per UGC guide lines.

Suggested manuals

Manual of laboratory experiments in cell biology Edward, G.

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

B.Sc. II Year
B.Sc. PRACTICAL MODEL PAPER FOR IV SEMESTER
ZOOLOGY - CORE PAPER - IV
Cell Biology, Genetics and Evolution

Time:2 Hrs. Max. Marks: 25

| | |
|---|---|
| 1. Identification, labeled diagram and salient features of spots: (05 spots) | 10 |
| 2. Prepare and Identify Mitotic divisions with onion root tips: | 04 |
| 3. One Problem from Genetics | 03 |
| 4. One Problem from Evolution | 03 |
| 5. Certified practical record | 03 |
| 6. Album | 02 |
| 7. Viva voce | 02 |