B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

(With effect from 2016-2017)

I - SEMESTER

DSC-1A (Theory)

Animal Diversity – Invertebrates

Max. Marks: 80

UNIT – I

1.1 Kingdom Animalia, Brief history of Invertebrates.
1.2 Protozoa General characters and Classification up to classes with examples.
1.3 Type study of *Elphidium*, Life cycle of *Plasmodium.* Locomotion, Reproduction and Diseases of protozoans.
1.4 Porifera General characters, Classification of up to classes with examples.
1.5 Type study of *Sycon;* Canal system in sponges and Spicules.

UNIT – II

2.1 General characters and Classification of Cnidaria up to classes with examples.
2.2 Type study of *Obelia*, Polymorphism in hydrozoa; Corals and coral reef formation.
2.3 General characters and Classification of Platyhelminthes up to classes with examples.
2.4 Type study- *Schistosoma;* Parasitic Adaptations in Helminthes.
2.5 Nemathelminthes General characters, Classification of Nemathelminthes up to classes with examples; Type study of *Dracunculus.*

UNIT – III

3.1 Annelida General characters and Classification up to classes with examples.
3.2 Type study of *Hirudinaria granulosa.*
3.3 Evolutionary significance of Coelome and Coelomoducts and metamerism.
3.4 Arthropoda General characters and Classification of Arthropoda up to classes with examples.
3.5 Type study of Prawn; Mouth parts of Insects; Insect metamorphosis; *Peripatus* - Structure and affinities.

UNIT – IV

4.1 Mollusca General characters and Classification up to classes with examples.
4.2 Type study – *Pila*; Pearl formation; Torsion and detorsion in gastropods.
4.3 Echinodermata General characters and Classification of Echinodermata up to classes with examples.
4.4 Water vascular system in star fish; Echinoderm larvae and their significance.
4.5 Hemichordata General characters and Classification up to classes with examples; *Balanoglossus* - Structure and affinities.

ZOOLOGY PRACTICAL SYLLABUS FOR I SEMESTER
ZOOLOGY - PAPER - I
ANIMAL DIVERSITY - INVERTEBRATES

Max. Marks: 50

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. **Coelenterata:** *Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatula*

   iv. **Platyhelminthes:** *Planaria, Fasciola hepatica, Fasciola* larval forms – Miracidium, Redia, Cercaria, *Echinococcus granulosus, Taenia solium, Schistosoma haematobium*

   v. **Nemathelminthes:** *Ascaris(Male & Female), Drancunculus, Ancylostoma, Wuchereria*

   vi. **Annelida:** *Nereis, Aphrodite, Chaetopteurs, Hirudinaria,* Trochophore larva

   vii. **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.

   viii. **Mollusca:** *Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus,* Glochidium larva

   ix. **Echinodermata:** *Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon,* Bipinnaria larva

   x. **Hemichordata:** *Balanoglossus,* Tornaria larva

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

(With effect from 2016-2017)

II - SEMESTER

DSC-1B (Theory)

Ecology, Zoogeography and Animal Behavior

Max. Marks: 80

UNIT – I

1.1 Ecosystem structure and functions.
1.2 Types of Ecosystems –Aquatic and Terrestrial.
1.3 Biogeochemical cycles - Nitrogen, Carbon, Phosphorus and Water.
1.4 Energy flow in ecosystem; Food chain, food web and ecological pyramids.
1.5 Animal Associations - Mutualism, commensalism, parasitism, competition, predation.

UNIT – II

2.1 Concept of Species, Population dynamics and Growth curves.
2.2 Community Structure and dynamics; Ecological Succession.
2.3 Ecological Adaptations.
2.4 Environmental Pollution – Sources, Effect and Control measures of Air, Water, Soil and Noise pollution.
2.5 Wildlife conservation - National parks and Sanctuaries of India, Endangered species. Biodiversity and hotspots of Biodiversity in India.

UNIT – III

3.1 Zoogeographical regions – Palaearctic, Nearctic, Neotropical, Oriental, Australian and Ethiopian regions - their Climatic and faunal peculiarities.
3.2 Wallace line
3.3 Discontinuous distribution.
3.4 Continental Drift

UNIT – IV

4.1 Types of Behaviour- Innate and Acquired, Instinctive and Motivated behavior.
4.2 Taxes, Reflexes, Tropisms.
4.3 Physiology and phylogeny of learning, trial and error learning, Imprinting, habituation, Classical conditioning, Instrumental conditioning.
4.4 Social behavior, Communication, Pheromones.
4.5 Biological rhythms, Biological clocks, Circadian rhythms.

B.Sc. PRACTICAL SYLLABUS FOR II SEMESTER
ZOOLOGY - Core Paper – II
Ecology, Zoogeography and Animal Behavior

Max. Marks: 50

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'

Yearwise - 2016-2017

B. Sc (ZOOLOGY) III Year (THEORY PAPER – IV)
APPLIED ZOOLOGY

80 hrs
(3 hrs/week)

UNIT – I

1.0. FISHERIES AND AQUACULTURE

1.1. Capture fisheries – Introduction — 2 hours
1.2. Types of fisheries, Fishery resource from Freshwater — 4 hours
1.3. Fin-fish and shell-fish fisheries — 2 hours
1.4. Fishing gears and fishing crafts — 3 hours
1.5. Site selection criteria — 2 hours
1.6. Aquaculture systems — 2 hours
1.7. Induced breeding — 3 hours
1.8. Hatchery design and Management — 2 hours
1.9. Shrimp and prawn culture — 2 hour
1.10. Post-harvest technology — 2 hours
1.11. Preservation and processing – Freezing, solar drying, Canning, Salting smoking 4 hours

UNIT – II

2.0. CLINICAL SCIENCE

2.1. Hematology — 10 hours
- 2.1.1. Blood composition and functions
- 2.1.2. Blood groups and Rh factor, transfusion problems
- 2.1.3. Blood diseases – Anemia, Leukemia, Leucocytosis, Leucopaenia
- 2.1.4. Biopsy and autopsy – Clinical importance

2.2. Immunology — 16 hours
- 2.2.1. Types of immunity – Innate and acquired, organs of immune system
- 2.2.2. Antigens – Haptens and epitopes
- 2.2.3. Structure and biological properties of human immunoglobulin G (IgG)
- 2.2.4. Humoral immunity and cell mediated immunity, B and T- cells
- 2.2.5. Hypersensitivity – immediate and delayed

UNIT – III

3.0. ANIMAL BIOTECHNOLOGY:

3.1. Animal Biotechnology: Scope of Biotechnology, Cloning vectors – Characteristics of vectors, Plasmids — 8 hours
3.2. Gene Cloning – Enzymatic cleavage of DNA, Restriction enzymes (Endonucleases) and Ligation. — 6 hours
3.3. Transgenesis and Production of transgenic animals (Fish and Goat) — 6 hours
3.4. Application of Stem Cell technology in Cell based therapy (Diabetes and Parkinson's diseases) — 6 hours

From 2016 - 2017

KAKATIYA UNIVERSITY
U.G. ZOOLOGY (Under CBCS)
B.Sc. Final Year (DSE-1E)
SEMESTER – V

from [redacted]

Elective

A) Applied Zoology (Theory)

Max. Marks:

UNIT – I

1.1.Types of Fisheries, culture of Fresh Water Fish and Prawn
1.2. Fresh water fishing gears and crafts; Induced Breeding.
1.3. Hatchery design and Management of fish and prawn, Transportation of fish and prawn seed.
1.4 Preservation, Processing and By-products of fishes.
1.5 Fish Diseases and control measures

UNIT – II

2.1. Life cycle of *Bombyx mori*
2.2 Structure of silk gland and secretion of silk
2.3 Silkworm rearing technology, Spinning, harvesting and storage of cocoons.
2.4 Silk worm Pests and Diseases: Uzi fly; Protozoan, Viral, Fungal and Bacterial; Control and prevention.
2.5 Prospects of Sericulture in India

UNIT – III

3.1 Selection of Bee Species for Apiculture. Bee Keeping Equipment.
3.2 Methods of Extraction of Honey (Indigenous and Modern).Bee Diseases and Enemies.
3.3 Products of Apiculture Industry and its Uses (Honey, Bees Wax).
3.4 Introduction of Vermiculture and Vermicomposting. Vermiculture techniques. Bedding, Essential parameters for Vermiculture and Management
3.5 Methods of Harvesting (Manual & Mechanical). Economic Importance of Vermiculture.

UNIT – IV

4.1. Classification of Fowls based on their use – Broilers and Commercial layers.
4.2. Principles of poultry breeding, Management of breeding stock and broilers, Processing and preservation of eggs.
4.3. Poultry diseases - Viral, Bacterial, Fungal, Protozoan
4.4. Management of a modern Poultry Farm, progressive plans to promote Poultry as a Self-Employment venture
4.5. Dairy farm and its management, Animal Husbandry – Introduction, Preservation of semen, artificial insemination of cattle, Induction of early puberty and synchronization of estrus in cattle.

Prof. T. RAVINDER REDDY
Chairman ,BOS
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KAKATIYA UNIVERSITY
U.G. ZOOLOGY (Under CBCS)
B.Sc. Final Year (DSE-1E)
SEMESTER – V

Elective

A) Applied Zoology (Practical)

Max. Marks: 25

1. Identification and study of important cultivable and edible fishes - Any five
2. Identification and study of important cultivable and edible crustaceans - Any five
3. Identification different larvae of silk worm- Using specimens / pictures
4. Identification of mulberry and non mulberry silkworms
5. Mounting of mouth parts of adult silk worm and silk gland of larva
6. Estimation of quality of milk from different dairy farm units – specific gravity, fat content, pH viscocity.
7. Identification of purity of Honey in different samples
8. Field visits to a Vermiculture / Sericulture / fisheries / apiculture / poultry / dairy farm- submission of any 3 Reports

- **Laboratory Record work shall be submitted at the time of practical examination**
- **Computer aided techniques should be adopted as per UGC guide lines.**

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY I Year

SEMESTER – II

ANIMAL DIVERSITY – VERTEBRATES

(Core Paper – II)

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

UNIT – I

1.1 Hemichordata

1.1.1 General characters and Classification of Hemichordates upto classes with examples
1.1.2*Balanoglossus*- Structure and affinities
1.1.3. Larval Significance (Tornaria)

1.2. Protochordata

1.2.1 General Characters and Classification of Chordates up to orders with examples
1.2.2 Salient features of Urochordata; Retrogressive metamorphosis in Urochordata
1.2.3 Salient features and affinities of Cephalochordata
1.2.4 General Characters of Cyclostomata; Comparison of *Petromyzon*and *Myxine*

UNIT – II

2.1 Pisces

2.1.1 General characters of and Classification of Pisces up to orders with examples
2.1.3*Scoliodon*- Digestive,Respiratory, Circulatory and Nervous system
2.1.4 Types of Scales, Types of Fins
2.1.5 Migration in Fishes

2.2 Amphibia

2.2.1 General characters and Classification of Amphibians up to orders with examples.
2.2.2***Rana tigrina***- Respiratory, Circulatory and Nervous systems
2.2.3 Parental care in Amphibians; Neoteny and Paedogenesis
2.2.4 Metamorphosis in Amphibians and its hormonal control

Unit – III

3.1 Reptilia

3.1.1 General characters and Classification of Reptilia up to orders with examples
3.1.2*Calotes*–Digestive,Respiratory, Circulatory and Nervous systems
3.1.3 Temporal fossa in Reptiles and its evolutionary importance
3.1.4 Distinguished characters of Poisonous and Non-poisonous snakes

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Kakatiya University
WARANGAL-506009

3.2 Aves

3.2.1 General characters and Classification of Aves upto orders with examples.
3.2.2***Columba livia***- Digestive, Respiratory,Circulatory and Nervous systems
3.2.3 Migration in Birds
3.2.4 Flight adaptation in Birds

Unit – IV

4.1 Mammalia

4.1.1 General characters and Classification of Mammalia upto orders with examples
4.1.2***Rabbit***- Digestive, Respiratory,Circulatory and Nervous systems
4.1.3Dentition in Mammals
4.1.4 Aquatic adaptations in Mammals

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 CollegePublishing, Saunders College Publishing

5. **George C. Kent, Robert K. Carr**. *Comparative Anatomy of the Vertebrates*, 9th ed. McGrawHill.

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.

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY I Year

SEMESTER – II

ANIMAL DIVERSITY - VERTEBRATES (PRACTICAL)

Instruction: 3 hrs per week
No. of Credits: 1

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

1. **Hemichordata:** *Balanoglossus, Tornmaria larva*
2. **Protochordata:** *Amphioxus, Amphioxus* T.S. through pharynx
3. **Cyclostomata:** *Petromyzon, Myxine, Ammocoetus larva*
4. **Pisces:** *Sphyrna, Pristis, Torpedo, Channa, Pleuronectes, Hippocampus, Exocoetus, Echieneis, Labeo, Catla, Clarius, Anguilla, Protopterus,* Scales: Placoid, Cycloid, Ctenoid
5. **Amphibia:** *Ichthyophis, Amblystoma, Siren,Hyla, Rachophous,Bufo, Rana,* Axolotal larva
6. **Reptilia :** *Draco, Chemaeleon, Gecko, Uromastix, Vipera russeli, Naja, Bungarus, Enhydrina, Typhlops, Ptyas, Testudo, Trionyx, Crocodilus*
7. **Aves:** Archaeopteryx, *Passer, Psittacula, Bubo, Alcedo, Columba, Corvus, Pavo* ,Collection and study of different types of feathers: Quill, Contour, Filoplume, Down
8. **Mammalia:** *Ornithorthynchus, Tachyglossus, Pteropus, Funambulus, Manis, Loris,* Hedgehog;
9. **Histology:**T.S. of Liver, Pancreas, Kidney, Stomach, Intestine, Lung, Artery, Vein, Bone T.S, Spinal Cord. T.S.

II. Osteology:
Rabbit – Axial Skeleton (Bones of Skull and Vertebral Column),
Varanus, Pigeon and Rabbit - Appendicular skeleton (Bones of Limbs and Girdles

III. Demonstration of dissection / dissected / virtual dissection: Labeo / Tilapia
1. Digestive system 2. Brain, Weberian Oscicles3. V, VII, IX, X cranial nerves

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

V. 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.

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

Suggested manuals:

1. **S.S.Lal,** Practical Zoology – Vertebrata
2. **P.S.Verma,** A manual of Practical Zoology– Chordata

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY III Year

SEMESTER – VI

ECOLOGY, ZOOGEOGRAPHY AND EVOLUTION

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

UNIT – I

1.1 Ecology- I

1.1.1 Ecosystem Structure and Functions; Types of Ecosystems – Aquatic and Terrestrial
1.1.2 Bio-geo chemical nutrient cycles - Nitrogen, Carbon, Phosphorus and Water
1.1.3 Energy flow in ecosystem
1.1.4 Food chain, food web and ecological pyramids
1.1.5 Animal Associations-Mutualism; Commensalism;Parasitism; Competition, Predation

UNIT – II

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, Soiland Noise Pollution
2.1.5 Wildlife conservation - National Parks and Sanctuaries of India, Endangered species; Biodiversity and Hotspots of Biodiversity in India.

UNIT – III

3.1 Zoogeography

3.1.1 Zoogeographical regions
3.1.2 Climatic and faunal peculiarities of Palaearctic, Nearctic, Neotropical, Oriental, Australian and Ethiopian regions
3.1.3 Wallace line, Discontinuous distribution
3.1.4 Continental Drift

Unit – IV

4.1. Evolution

4.1.1 Theories of Evolution – Lamarckism, Neo-Lamarckism, Darwinism, Neo-Darwinism, Modern synthetic theory, Evidences of Evolution.
4.1.2 Forces of Evolution–Natural Selection, Genetic drift, Gene flow, Genetic load, Organic variations,Hardy Weinberg Equilibrium.
4.1.3. Isolation –Premating and post mating isolating mechanisms.
4.1.4 Speciation: Methods of Speciation - Allopatric and Sympatric; Causes and Role of Extinction in Evolution.

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KAKATIYA UNIVERSITY
Under Graduate Courses (Under CBCS 2019 - 2022)
B.Sc. ZOOLOGY III Year
SEMESTER – VI

ECOLOGY, ZOOGEOGRAPHY AND EVOLUTION PRACTICAL

Instruction: 3 hrs per week
No. of Credits: 1

Ecology

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, effluents.
5. Identification of Zooplankton from different water bodies.
6. Study of Pond Ecosystem / Local polluted site – Report submission.

Zoogeography

1. Study of at least 3 endangered or threatened wild animals of India through photographs/specimens/models
2. Field visit to Zoo Park to study the management, behavior and enumeration of wild animals.
3. Identification of Zoogeographical realms from the Map and identify specific fauna of respective regions.

Evolution

1. Museum Study of fossil animals: **Peripatus; Coelacanth fish, Dipnoi fishes; Sphenodon; Archaeopteryx.**
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**
- **Computer aided techniques should be adopted as per UGC guide lines.**

Suggested manuals:

1. Ecology Student Lab Manual, Biology Labs – Robert Desharnais, JeffreyBell.
2. Ecology Lab manual – Darrell S Vodopich.

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