SYLLABUS FOR
B. Sc. ZOOLOGY
(With effect from the academic year 2016-17 under CBCS)

Prof. T. RAVINDER REDDY
Chairman
Board of studies

SATAVAHANA UNIVERSITY
KARIMNAGAR- 505002
TELANGANA STATE

I - SEMESTER

Core Paper – I

Animal Diversity – Invertebrates

Periods: 60 **Max. Marks: 80**

UNIT – I (15 Periods)

1.1 Brief history of Invertebrates

1.1. Kingdom Animalia

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 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 Insect metamorphosis
3.2.5 *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

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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"

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B.Sc. ZOOLOGY MODEL PAPER FOR I SEMESTER
ZOOLOGY – CORE PAPER - I
ANIMAL DIVERSITY - INVERTEBRATES

Time: 3 hrs **Max. Marks: 80**

Section- I (Marks: 5x4=20)
Answer any FIVE of the following
Draw labeled diagrams wherever necessary

1. Unit-I
2. Unit-I
3. Unit-II
4. Unit-II
5. Unit-III
6. Unit-III
7. Unit-IV
8. Unit-IV

Section- II (Marks: 4x15=60)
Answer FOUR of the following
Draw labelled diagrams wherever necessary

1. a) UNIT-I
   Or
   b) UNIT-I

2. a) UNIT-II
   Or
   b) UNIT-II

3. a) UNIT-III
   Or
   b) UNIT-III

4. a) UNIT-IV
   Or
   b) UNIT-IV

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

Periods: 30 **Max. Marks: 25**

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

I. Protozoa(slides)

1. Amoeba

2. Paramoecium

3. Paramoecium Binary fission

4. Paramoecium Conjugation

5. *Vorticella,*

6. Entamoeba histolytica

7. Plasmodium vivax

II. Porifera

8. Sycon

9. Spongilla

10. Euspongia,

11.Sycon - T.S

12. Sycon-L.S,

13.Spicules

14. Gemmule

III. Coelenterata:

15. Obelia – *Colony*

16. Obelia- *Medusa,*

17. Aurelia,

18. Physalia

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19. Velella,
20. Corallium,
21. Gorgonia
22. Pennatula

IV. Platyhelminthes

23. *Planaria*
24. *Fasciola hepatica*
25. *Echinococcus granulosus,*
26. *Taenia solium,*
27. *Schistosoma haematobium*

V. Nemathelminthes:

28. *Ascaris-Male*
29. Ascaris- *Female*
30. Drancunculus
31. Ancylostoma
32. Wuchereria boncrofti

VI. Annelida

33. Nereis
34. Aphrodite
35. Chaetopteurs
36. Hirudinaria
37. Trochophore larva

VII. Arthropoda

38. Cancer
39. Palaemon
40. Scorpion

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41. Scolopendra
42. Sacculina
43. Limulus
44. Peripatus
45. Nauplius
46. Mysis
47. Zoea

VIII. Mollusca

48. Chiton
49. Pila
50. Pterdo
51. Murex
52. Sepia
53. Loligo
54. Octopus
55. Nautilus
56. Glochidium larva

IX. Echinodermata

57. *Asterias*
58. *Ophiothrix*
59. *Echinus*
60. *Clypeaster*
61. *Cucumaria*
62. *Antedon*
63. Bipinnaria larva

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X. Hemichordata

64. *Balanoglossus*

65. Tornaria larva

XI. Dissections

Dissect and display and draw a neat labeled diagram of the following.

66. Prawn- Digestive system

67. Prawn-Nervous system

68. Prawn-Mounting of statocyst

69. Prawn-cephalic appendages

70. Prawn-Thorasic appendages

71. Prawn-Abdominal appendages

72. Pila- Nervous system

73. Pila- radula mounting

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

XIII. 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.

XIV. 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

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

Time: 3 Hrs. **Max. Marks: 25**

1. Identify the given spotters (4 specimens&1 slide)giving reasons for the identification with a neat labeled diagram and salient features of spots	5X2=10
2. Dissect and display and draw a neat labeled diagram	2+2=4
3. Project Work	03
4. Certified practical record	03
5. Animal Album	03
6. Viva voce	02

Note:

1. For 1&2 question bank is given
2. 3,4,5 common for all batches

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B.Sc. ZOOLOGY SYLLABUS UNDER CBCS

(With effect from 2016-2017)

II - SEMESTER

Core Paper – II

Ecology, Zoogeography and Animal Behavior

Periods: 60 **Max. Marks: 80**

UNIT – I (15Periods)

1.1 Ecology - I

1.1.1 Ecosystem structure and functions.
1.1.2 Pond ecosystem and Forest ecosystem
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

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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
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 Evolutionalry Approach

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

Time: 3 hrs **Max. Marks: 80**

Section- I (Marks: 5x4=20)
Answer any FIVE of the following
Draw labeled diagrams wherever necessary

1. Unit-I
2. Unit-I
3. Unit-II
4. Unit-II
5. Unit-III
6. Unit-III
7. Unit-IV
8. Unit-IV

Section- II (Marks: 4x15=60)
Answer FOUR of the following
Draw labelled diagrams wherever necessary

1.a) UNIT-I
Or
b) UNIT-I

2. a) UNIT-II
Or
b) UNIT-II

3.a) UNIT-III
Or
b) UNIT-III

4.a) UNIT-IV
Or
b) UNIT-IV

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

Periods: 30 **Max. Marks: 25**

I. Major Experiments:

1. Estimation of salinity (chlorides) of water in given samples.
2. Estimation of Carbonates in the given water samples.
3. Estimation of BiCarbonates in the given water samples
4. Estimation of dissolved oxygen in given water samples(pond water/ sewage water /effluents).
5. Observe the response of invertebrates in different lightening conditions

II. **Minor experiments**:

6. Determination of pH of soil.
7. Determination of pH of water.
8. Identification of zooplankton in given water samples.
9. Identification of zoo geographical realms from the map and identify the specific fauna of respective regions.

III. Submission of project report.
Study of pond ecosystem/ local polluted site.

IV. Submission of field note book and animal album.
(students are supposed to visit Zoo park to study the management, behavior and enumeration of wild animals in order to submit FNB & students are supposed to study at least 3 endangered and threatened wild animals in India to submit animal album)

V. Viva

VI. Record.

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'

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PRACTICAL MODEL PAPER FOR II SEMESTER
ZOOLOGY - Core Paper – II
Ecology, Zoogeography and Animal Behavior

Scheme of evaluation

Time: 3 Hrs. **Max. Marks: 25**

I. Major experiment		10
(principle-2, procedure-4, result-4)		
II. Minor experiment	05	
(principle-1, procedure-2, result-2)		
III. project report		03
IV. Field note book and animal album		02
V. certified field note book		03
VI. Viva		02

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B.Sc. ZOOLOGY SYLLABUS UNDER CBCS
(With effect from 2016-2017)
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. Comparision of the *Petromyzon* and *Myxine*
1.1.6. General characters and classification of Chordata upto orders with examples.

1.2. Pices
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 Amphibias
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 amphibia, Neotony.

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.

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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

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

4.2 Development of Frog up to formation of primary germ layers
4.3 Formation of Foetal membrane in chick embryo and their functions
4.4 Types and functions of Placenta in mammals
4.5 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.

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B.Sc. ZOOLOGY MODEL PAPER FOR III SEMESTER
ZOOLOGY - CORE PAPER - III
Animal Diversity- Vertebrates and Developmental Biology

Time: 3 hrs **Max. Marks: 80**

Section- I (Marks: 5x4=20)
Answer any FIVE of the following
Draw labeled diagrams wherever necessary

1. Unit-I
2. Unit-I
3. Unit-II
4. Unit-II
5. Unit-III
6. Unit-III
7. Unit-IV
8. Unit-IV

Section- II (Marks: 4x15=60)
Answer FOUR of the following
Draw labelled diagrams wherever necessary

1.a) UNIT-I
Or
b) UNIT-I

2. a) UNIT-II
Or
b) UNIT-II

3.a) UNIT-III
Or
b) UNIT-III

4.a) UNIT-IV
Or
b) UNIT-IV

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ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER

ZOOLOGY - CORE PAPER - III

Animal Diversity- Vertebrates and Developmental Biology

Periods: 30 **Max. Marks: 25**

I. Dissections(Labeo/Tilapia)

1. Digestive system
2. Brain
3. Weberian ossicles
4. V & VII cranial nerves
5. IX & X cranial nerves

II. Spotters:

Proto chordates:

6. Amphioxus
7. Amphioxus T.S. through pharynx

Cyclostomata

8. Petromyzon
9. Myxine
10. Ammocoetus larva

Pisces

11. Sphyrna
12. Pristis
13. Torpedo
14. Channa
15. Pleuronectes
16. Hippocampus
17. Exocoetus
18. Echieneis
19. Labeo
20. Catla
21. Clarius
22. Auguilla
23. Protopterus

Scales

24. Placoid
25. Cycloid
26. Ctenoid

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Amphibia
27. Ichthyophis
28. Amblystoma
29. Siren
30. Hyla
31. Rachophous
32. Bufo
33. Rana
34. Axolotal larva

Reptilia :
35. Draco
36. Chemaeleon
37. Gecko
38. Uromastix
39. Vipera russel
40. Naja
41. Bungarus
42. Enhydrina
43. Typhlops
44. Testudo
45. Trionyx
46. Crocodilus
47. Ptyas.

Aves
48.Archaeopteryx
49. *Passer*
50. *Psittacula*
51. *Bubo*
52. *Alcedo*
53. *Columbia*
54. *Corvus*
55. *Pavo*

Mammalia
56.*Ornithorthynchus*
57. *Tachyglossus*
58. *Pteropus*
59. *Funambulus*
60. *Manis*
61. *Loris*
62. Hedgehog

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Osteology :

Rabbit – Axial skeleton

63. Skull
64. Vertebral Column

Appendicular skeleton

65. Varanus-Pectoral girdle
66. Varanus-humerus
67. Varanus-radioUlna
68. Varanus-Pelvic girdle
69. Varanus-Femur
70. Varanus-TibioFibula
71. Pigeon -Pectoral girdle
72. Pigeon-humerus
73. Pigeon -radioUlna
74. Pigeon -Pelvic girdle
75. Pigeon -Femur
76. Pigeon -TibioFibula
77. Rabbit -Pectoral girdle
78. Rabbit -humerus
79. Rabbit -radioUlna
80. Rabbit -Pelvic girdle
81. Rabbit -Femur
82. Rabbit –TibioFibula

EMBRYOLOGY

83. Mounting of sperm
84.T.S of testis
85. T.S of ovary
86. Cleavage 2- cell stage
87. cleavage 4- cell stage
88.cleavage 8-cell stage
89. morula
90. blastula of frog
91.gastrula of frog
92. 24 hours chick embryo
93. 48 hours chick embryo
94. 72 hours chick embryo

Histology

95. T.S. of Liver
96. T.S of Pancreas,
97. T.S of Kidney
98. T.S OF Stomach
99. T.S OF Intestine
100. T.S OF Lungs

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101. T.S OF Artery
102. T.S OF Vein
103.T.S OF Bone
104.T.S. OF Spinal cord

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

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

ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER
ZOOLOGY - CORE PAPER - III
Animal Diversity- Vertebrates and Developmental Biology

Time: 3 Hrs. **Max. Marks: 25**

1. Dissection Diagram + Description	2+2=4
2. Spotters(4 chordates+1 Osteology+1 Histology+1 Embryology)	7x2=14
3. Animal Album +collection of different feathers	02
4. Viva voce	02
5. Certified Record	03
Total:	25

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B.Sc. ZOOLOGY SYLLABUS UNDER CBCS
(With effect from 2016-2017)
IV - SEMESTER
Core Paper – IV
Cell and Molecular Biology, Genetics, Evolution

Max. Marks: 80

UNIT – I
1. Cell Biology
1.1. Ultra structure of animal cell
1.2. Structure and functions of plasma membrane and proteins.
1.3. Structure and functions of cell organelles –
Endoplasmic reticulum, Golgi body, Ribosomes, Lysosomes, centrosomes, Mitochondria and Nucleus
1.4. Chromosomes – Structure, types, giant chromosomes
1.5. Cell Division - Mitosis, Meiosis, Cell cycle and its regulation.

UNIT – II
2. Molecular Biology
2.1 DNA (Deoxyribo Nucleic Acid) – Structure and replication
2.2 RNA (Ribo Nucleic Acid) - Structure, types
2.3 Protein Synthesis – Transcription and Translation
2.4 Gene Expression – Genetic Code; operon concept
2.5 Molecular Biology Techniques- Polymerase Chain Reaction, Electrophoresis
UNIT – III
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. Inborn errors of metabolism.
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
4.3. Hardy Weinberg Law.
4.4. Role of 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

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Suggested readings

1. **Lodish, Berk, Zipursky, Matsudaria, Baltimore, Darnel**l *'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
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14. **Jan M. Savage**. *Evolution*, 2nd ed, Oxford and IBH Publishing Co., New Delhi.
15. **Gupta P.K**., 'Genetics'

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B.Sc. ZOOLOGY MODEL PAPER FOR IV SEMESTER
ZOOLOGY Core Paper – IV
Cell Biology, Genetics and Evolution

Time: 3 hrs **Max. Marks: 80**

Section- I (Marks: 5x4=20)
Answer any FIVE of the following
Draw labeled diagrams wherever necessary

1. Unit-I
2. Unit-I
3. Unit-II
4. Unit-II
5. Unit-III
6. Unit-III
7. Unit-IV
8. Unit-IV

Section- II (Marks: 4x15=60)
Answer FOUR of the following
Draw labelled diagrams wherever necessary

1.a) UNIT-I
Or
b) UNIT-I

2. a) UNIT-II
Or
b) UNIT-II

3.a) UNIT-III
Or
b) UNIT-III

4.a) UNIT-IV
Or
b) UNIT-IV

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ZOOLOGY PRACTICAL SYLLABUS FOR IV SEMESTER
ZOOLOGY Core Paper – IV
Cell Biology, Genetics and Evolution

Max. Marks: 25

I. CYTOLOGY
1. Preparation and Identification of stages of slides of Mitotic divisions with onion root tips

II.PROBLEMS:
2. problems on mendelian inheritance
3. hardy Weinberg law

III. SPOTTERS:

1. Peripatus
2. Coelocanth fish
3. Lepidosiren
4. Neoceratodus
5. Petromyzon
6. Sphenodon
7. Archaeopteryx
8. Mitosis-prophase
9. Mitosis-metaphase
10. Mitosis-anaphase
11. Mitosis-telophase
12. Meosis-leptotene
13. Meosis-zygotene
14. Meosis-pachetene
15. Meosis-diplotene
16. Meosis-diakinesis
17. Meosis-metaphase I
18. Meosis-anaphase I
19. Meosis- telophase I
20. Alcaptonurea
21. Phenyl ketonurea
22. Klinifelter syndrome
23. Down's syndrome
24. Cridue chat syndrome
25. Turners syndrome

Suggested manulas:

Manual of laboratory experiments in cell biology Edward.G.

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

Time: 3 Hrs. **Max. Marks: 25**

1. Experiment of mitosis	05
2. Problem of genetics/ Hardy weinberg law	05
3. Spotters	5x2=10
4. Certified practical record & viva	05
Total	**25**

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