

GONDWANA UNIVERSITY GADCHIROLI
SEMESTER SYSTEM SYLLABUS
FOR

B.Sc. Part I

Subject- Zoology

Semester I – Paper I

Life and Diversity of Animals
(Protozoa to Annelida)

Unit – I

- | | |
|---|---|
| 1. Introduction of Non-chordates – Animal sub-kingdom. | 1 |
| 2. Protozoa - General characters and classification. | 1 |
| 3. Plasmodium – Structure and life cycle. | 3 |
| 4. Parasitic protozoans of Man, mode of infection and diseases Caused by Entamoeba, Trypanosoma. | 4 |
| 5. Paramoecium – Structure and Reproduction. | 2 |

Unit II

- | | |
|--|---|
| 1. Porifera – General characters and classification. | 2 |
| 2. Sycon – Different cells types, Canal System in sponges. | 3 |
| 3. Coelenterata – General characters and classification. | 1 |
| 4. Obelia - Structure and life cycle. | 3 |
| 5. Polymorphism in Coelenterata. | 2 |

Unit – III

- | | |
|--|---|
| 1. Platyhelminthes – General characters and classification | 2 |
| 2. Taenia solium – Structure and Life cycle | 3 |
| 3. Aschelminthes – General characters and classification | 1 |
| 4. Ascaris – External morphology, Reproductive system and Life cycle. | 3 |
| 5. Diseases caused by parasitic nematodes, causes and control measures – Ancylostoma, Wuchereria. | 3 |

Unit – IV

- | | |
|---|---|
| 1. Annelida – General characters and classification. | 1 |
| 2. Leech – External morphology, Digestive system, Excretory system, Reproductive system, Copulation Fertilization, | 6 |
| 3. Trochophor Larva and its Significance | 2 |
| 4. Vermi culture and its importance. | 2 |

GONDWANA UNIVERSITY GADCHIROLI
SEMESTER SYSTEM SYLLABUS
FOR
B.Sc. Part I
Subject- Zoology
Semester I – Paper II
Environmental biology

Unit I

- • Ecosystem - definition and type **2**
- Detailed study of pond ecosystem. **2**
- Producers, consumer and decomposer. **2**
- • Energy flow in ecosystem, food chain, food web and pyramids **5**

Unit II

- Biodiversity and its conservation. **2**
- Genetic diversity, species diversity. **2**
- Causes of reduction, methods of conservation. **4**
- Present status of biodiversity in India, Conservation project, Project
- Tiger, National park and sanctuaries (Nagzira, Tadoba, Kaziranga). **3**

Unit III

- Basic components of the Environment
- Atmosphere: Major zones and importance, composition of air. **3**
- Hydrosphere: Global distribution of water, physicochemical
- characteristic of water. **3**
- Lithosphere: Types of rocks, formation of soil. **3**
- Renewable and non- renewable energy sources. **2**

Unit IV

- Environmental pollution
- Sources, effects of air pollution with special reference to Acid rain,
- Global warming and Greenhouse effect, Control measures. **5**
- Sources, effects and control measures of water pollution **3**
- Sources, effects and control measures of Noise pollution **2**
- Sources, effects and control measures of Heavy metal pollution (lead, mercury and cadmium). **2**

B.Sc. I Zoology Semester I

References :

Paper I – Life and Diversity of Animals

1. Barnes – **Invertebrate zoology (Holt-Saunders international)** Philadelphia, USA
2. Barradaile L.A. & Potts F.A. – **The invertebrate**
3. Nigam – **Biology of non chordates**
4. Kotpal, Agrawal & Khetrapal – **Modern text book of zoology invertebrates**, Rastogi Publication, Meerut.
5. Jordan E.L. & P.S. Verma – **Invertebrate zoology**, S. Chand & Co. Ltd. New Delhi.
6. Puranik P.G. & Thakur R.S. – **Invertebrate zoology**
7. Majupuria T.C. – **Invertebrate zoology**
8. Dhama & Dhama – **Invertebrate zoology**
9. Parker & Hashwell, **Textbook of Zoology Vol. I (Invertebrates)** A.Z.T.B.S. Publishers & Distributors, New Delhi.
10. Dr. S.S. Lal **Practical Zoology Invertebrates 9th edition**, Rastogi Publication Meerut.
11. E.J.W. Barrington – **Invertebrate Structure and Function** ELBS III Edition
12. R.L. Kotpal – **Phylum Protozoa to Echinodermata (series)**, Rastogi and Publication, Meerut.

Paper II- Environmental Biology

1. Ashthana D.K. – **Environmental Problem & Solution**
2. Agrawal K.C. – **Environmental Biology**
3. Agrawal K.C. - **Biodiversity**
4. Mukharjee – **Environmental Biology**
5. S. Arora – **Fundamentals of Environmental Biology**
6. Sharma – **Ecology & Environmental Biology**
7. Verma P.S. & Agrawal V.K. – **Environmental Biology, S. Chand.**
8. Trivedi & Rao – **Air Pollution**
9. Chapman & Reiss – **Ecology-Principles and Applications**, Cambridge.
10. Chatterjee B – **Environmental Laws-Implementation and Problems.**
11. . Sharma P.D. – **Environmental Biology**, Rastogi Publication, Meerut.
12. Trivedi R.K. – **Hand Book of Environmental Laws, Rules, Guidelines, Compliances and Standards, Enviromedia.**
13. . Odum E.P. and Barret – **Fundamentals of Ecology**, Thomson.
14. . Smith R.L. – **Ecology and Field Biology**, Harper Collins.
15. D.N. Saksena & D.M. Gaidhane – **Environmental Biology**, Studium Press (India)

B.Sc. I - Zoology

Semester I – Practical I

I. Classification of Specimen (class/order)

Protozoa – *Enamoeba*, *Euglena*, *Paramoecium*

Porifera – *Leucosolenia*, *Euplectella*, *Spongilla*

Coelenterata - *Aurelia*, *Tubipora*, *Adamsia*.

Platyhelminthes - *Planeria*, *Fasciola*, *Taenia*.

Aschelminthes- *Ascaris*, *Ancylostoma*, *Wucheria*

Annelida – *Aphrodite*, *Neries*, *Pheretima*, *Pontobdella*

II. Study of Slides:

Entamoeba, *Plasmodium*, Sponge gemule, L.S. *Sycon*, *Obelia* medusa, Miracidium, Cercaria larva of *Fasciola*, T.S. *Ascaris* (male or female) , T.S. of Leech through crop.

III. Anatomical Observations

Anatomical observations, demonstration and detailed explanation of the following with the help of ICT tools/ models/ charts/ photographs etc.

- a. Leech – Digestive – Excretory and reproductive system
- b. Earthworm – Nervous system, Reproductive system

IV. Study of permanent Preparation of the following with the help of already available permanent slides ICT tools/ models/ charts/ photographs etc. (Any three)

Obelia colony, sponge gemmules, sponge spicules, *Nereis* parapodia, Jaws of Leech, Nerve ring of earthworm

V. Practicals in Environmental Biology

Estimation of dissolved oxygen of water

Estimation of free CO₂ of water

Estimation of pH and turbidity of water

Estimation of Hardness of water

Study of aquatic macrophytes in pond ecosystem

(floating/submerged/emergent/marginal)

Study of aquatic insects

Visit to a pond and submission of report on zooplankton.

Study of Biodiversity of invertebrates in our area.

GONDWANA UNIVERSITY GADCHIROLI
SEMESTER SYSTEM SYLLABUS
FOR
B.Sc. Part I
Subject- Zoology

GONDWANA UNIVERSITY,
GADCHIROLI SEMESTER SYSTEM
SYLLABUS
FOR
R
B.Sc.
ZOOLOGY
B.Sc. Part I
SEMESTER – I
PRACTICALS

Distribution of marks for Practical at the end of Semester. I

| | |
|--|-----------|
| i) Anatomical Observations | 05 |
| ii) Identification of Spots, 2 Specimens, 2 Slides, 1 Spot from Environmental Biology | 10 |
| iii) Practical from Environmental Biology (DO or CO ₂ or Alkalinity or Hardness)..... | 07 |
| iv) Permanent stained micropreparation (From Animal waste)..... | 03 |
| vi) Class Record..... | 02 |
| v) Biodiversity study tour & Submission of tour diary..... | 03 |
| Total..... | 30 |

GONDWANA UNIVERSITY GADCHIROLI
SEMESTER SYSTEM SYLLABUS
FOR
B.Sc. Part I
Subject- Zoology

Semester II – Paper I
Life and Diversity of Animals
(Arthropoda to Protochordata)

Unit I –

- | | |
|--|---|
| 1. Arthropoda – General characters and classification. | 1 |
| 2. Cock roach – External morphology, Digestive system, Reproductive system, mouth parts, sense organs. | 6 |
| 3. Insects as Vectors – Mosquito, Housefly, shadfly, Tse-Tse fly. | 2 |
| 4. Bioluminescence in Invertebrates. | 2 |

Unit II

- | | |
|---|---|
| 1. Mollusca – General characters and classification. | 1 |
| 2. Pila – External morphology, Digestive system, Nervous system, Respiratory system, Reproductive system. | 6 |
| 3. Shell and pearl formation in Mollusca. | 2 |
| 4. Torsion in Mollusca. | 2 |

Unit III

- | | |
|--|---|
| 1. Echinodermata – General characters and classification. | 1 |
| 2. Regeneration & autonomy in Echinodermata. | 2 |
| 3. Asterias – External morphology, water vascular system and locomotion, Bipinnaria larva. | 3 |
| 4. Hemichordata – General characters and classification | 2 |
| 5. Balanoglossus – External morphology, Affinities, Tarnaria larva. | 3 |

Unit IV

- | | |
|--|---|
| 1. Protochordata – General characters & classification. | 1 |
| 2. Amphioxus – Structure, Digestive system, Excretory system, sense organs. | 4 |
| 3. Herdmania – Structure, Digestive system, Ascidian tadpole, Retrogressive Metamorphosis. | 4 |
| 4. Agnatha – General characters of cyclostomata, (Petromyzon and Myxine) | 2 |

GONDWANA UNIVERSITY GADCHIROLI
SEMESTER SYSTEM SYLLABUS
FOR
B.Sc. Part I
Subject- Zoology
Semester II – Paper II
Cell Biology

Unit I

- Introduction, History and scope of cell biology, cell theory and its modern concept. **2**
- Prokaryotic and eukaryotic cell (Plant and Animal cell), mycoplasma. **2**
- Biological membrane: Sandwich model and fluid mosaic model osmosis, endocytosis (pinocytosis and phagocytosis), passive and active transport (Na⁺ K⁺ ion pump). **7**

Unit II

- Nucleus – Structure of nuclear membrane, pore complex (franke), Nucleocytoplasmic exchange. **5**
- Structure and general functions of Nucleolus. **2**
- Chromosome – structure and types, Nucleosome. **2**
- Giant Chromosome: Lampbrush and polytene chromosome. **2**

Unit III

- Ultrastructure of mitochondria, electron transport mechanism and oxidative phosphorylation. **5**
- Endoplasmic Reticulum – structure and types; function. **3**
- Golgi complex – structure and functions. **3**

Unit IV

- Lysosome: Structure, enzymes and polymorphism in lysosome. **3**
- Ribosome: Structure (lake's model), function, polyribosome. **3**
- Cell division: Mitosis, meiosis, synaptonemal complex, significance. **5**

B.Sc. I Zoology Semester II

References:

Paper I- Life and Diversity of Animals

1. Barnes – **Invertebrate zoology (Holt-Saunders international)**, Philadelphia, USA
2. Barradaile L.A. & Potts F.A. – **The invertebrate**
3. Nigam – **Biology of non chordates**
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12. R.L. Kotpal – **Phylum Protozoa to Echinodermata (series)**, Rastogi and Publication, Meerut.
13. . Parker J. and Haswell W. – **Text Book of Zoology**, ELBS Edition
14. Vidyarthi – **Text Book of Zoology**, Agrasia Publishers, Agra.
15. . Jordan E.L. and Verma P.S. – **Chordate Zoology**, S. Chand and Co., New Delhi

Paper II- Cell Biology

1. C.B. Powar, **Cell Biology** – Himalaya Publication, New Delhi.
2. C.B. Power, **Fundamental of Cell Biology** – Himalaya Publication, New Delhi.
3. Cooper – **Cell Biology**
4. Dr. S.P. Singh, Dr. B.S. Tomar – **Cell Biology 9th revised edition**, Rastogi Publication, Meerut.
5. Gupta P.K. – **Cell and Molecular Biology**, Rastogi Publication, Meerut.
6. Veer Bala Rastogi – **Introduction to Cell Biology**, Rastogi Publication, Meerut
7. De-Robertis – **Cell and Molecular Biology**, Holt Saunders
8. Gupta – **Cell and Molecular Biology**, Rastogi Publications
9. Alberts B. *et.al* – **Molecular Biology of the cell** (Sinauer)
10. . Lodish H. *et.al* – **Molecular Cell Biology**.
11. Gerald Karp – **Cell and Molecular Biology-Concepts and Experiments**, John Wiley, 2007.

B.Sc. I - Zoology

Semester II – Practical II

I. Observation, classification upto (class/order) and sketching of the following animals (specimen/model)

Phylum Arthropoda – Prawn, Limulus, Scolopendra, Julus, moth

Phylum Mollusca – Chiton, Pila, Dentalium, Unio, octopus

Phylum Echinodermata – Antedon, Holothuria, Echinus, Sea star, Brittle star

Phylum Hemichordata – Balanoglossus

Phylum Protochordata – Herdmania, Salpa, Doliolum, Amphioxus

II. Study of slides

Nauplius, Zoea, Megalopa, Glochidium, T.S. of arm of starfish, Bipinnaria,

Auricularia, Tornaria, T.S. of Balanoglossus through proboscis and collar, T.S. of

Balanoglossus through pharynx, gonads, intestine and caudal region.

III. Anatomical Observations

Anatomical observations, demonstration and detailed explanation of the following with the help of ICT tools/ models/ charts/ photographs etc.

a) Digestive and Nervous system of Cockroach.

b) Nervous system of Pila.

IV. Mounting - Study of permanent Preparation of the following with the help of already available permanent slides ICT tools/ models/ charts/ photographs etc. (Any five)

Mouth parts of cockroach, mosquito, Honey bee, Salivary gland and trachea of Cockroach, Redula of Pila, and Pedicellariae of starfish.

V. Practicals in cell Biology

- Study of compound and dissecting microscope
- Ultramicroscopic structure of Prokaryotic cell, Animal cell, Plant cell. (pictures)
- Study of Osmosis in Eukaryotic cell.(Human RBCs)
- Demonstration of mitotic cell division in onion root tip by squash method
- Demonstration of polytene chromosome in dipteran larvae with the help of already available permanent slides/ ICT tools/ models/ charts/ photographs etc.
- Demonstration of mitochondria in buccal epithelium by Janus Green- B method.
- Use of ocular micrometer and measurement of micro objects.

GONDWANA UNIVERSITY, GADCHIROLI
SEMESTER SYSTEM SYLLABUS
FOR
B.Sc. ZOOLOGY
B.Sc. Part I
SEMESTER – II
PRACTICALS

Distribution of marks for Practical at the end of Semester. II

| | |
|---|-----------|
| i) Anatomical Observations | 07 |
| ii) Identification & Comments on spots (3 Specimen, 2 Slide)..... | 10 |
| iii) Practical form Cell Biology | 05 |
| iv) Permanent stained micropreparation | 03 |
| v) Viva & Submission of slides..... | 03 |
| vi) Class Record..... | 02 |
| Total | 30 |

GONDWANA UNIVERSITY
GADCHIROLI CREDIT GRADE
SEMESTER SYSTEM B.Sc. I - Zoology
Question Paper pattern I
(Sem. I & II)

Note :- All questions are compulsory All questions carry equal marks Draw diagrams wherever necessary.

Time: 03 Hrs.

Total marks : 50

Question 1. Describe or write essay on :

**02 x 05 =
10
OR 01 x 10 = 10**

Unit I

OR

**A) Unit II
B) Unit II**

Question 2. Describe or write essay on :

**02 x 05 =
10
OR 01 x 10 = 10**

Unit III

OR

**C) Unit IV
D) Unit IV**

Question 3. Write notes on:

= 10

04 x 2 ½

**A) Unit I
B) Unit II
C) Unit III
D) Unit IV**

OR

**E) Unit I
F) Unit II
G) Unit III
H) Unit IV**

Question 4. Write notes on:

**A) Unit I
B) Unit II
C) Unit III
D) Unit IV**

OR

**04 x 2 ½ = 10
E) Unit I
F) Unit II
G) Unit III
H) Unit IV**

Question 5. Write in one or two lines only (Diagram NOT necessary) 01 x 10 = 10 (Solve any ten questions)

**A) Unit I
Unit III B) Unit II
H) Unit IV C) Unit III
I) Unit I
D) Unit IV
Unit II E) Unit I
K) Unit III
F) Unit II**

G)

J)

L) Unit IV