# Shri Govind Guru University, Godhara

## B.Sc Zoology Semester I

### Theory Major Paper I

### Title: Nonchordates, Animal Diversity, Cytology and Genetics

**(Credit 04)**

**Unit I : Non chordates I and Animals Diversity.**

**A.** Salient features & classification starting from Protiesta / Protozoa to Annelida giving suitable examples (As per practical syllabus).

**B.** Type Study Hydra - Systematic position, Habits, habitat, External Characters, Histology of Body wall, Nerve net, Reproduction and life cycle.

**Unit II : Animal diversity (Nonchordates)**

Type Study Earthworm (Pheretima posthuma)- classification, Habits & Habitat, External characters, Body wall, Digestive system, circulatory system, Excretory system, Nervous system, Reproductive system and Reproduction.

**Unit III : Cytology – I.**

**A.** Ultra Structure of a typical Animal cell, Nucleus, Mitochondria, ER, Eukaryotic Ribosomes.

**B.** Light Microscopes - 1) Simple 2) Compound

**Unit IV : Genetics – I**

Introduction to genetics and gene.
Mendel's Law of Heredity
Incomplete dominance, Codominance, multiple alleles – ABO Blood groups,Polygenic Inheritance (Skin color in man)
Lethal Genes-coat color in Rat

## REFERENCES:


1. A Manual of Zoology Vol. I & II, Ekambarnath Ayyar and Ananthakrishnan,Viswanthan Pvt. Ltd. Madras.
2. Biology of Animals, C. P. Hickman, L. S. Roberts, and A. Larson, McGrawHill Company, New York.
3. Biology of the Invertebrates, J. A. Pechenik, Tata-McGraw Hill Company,Ltd, New Delhi.
4. Integrated principals of Zoology, C. P. Hickman, L. S. Roberts, and A.Larson, McGraw Hill Company, New York.

5. Invertebrate Zoology Jordan, E. L. and Verma, P.S, S. Chand & Co. NewDelhi.
6. Invertebrate Zoology Dhami,P.S. and Dhami,J.K., S Chand & Co. Delhi.
7. Invertebrate Zoology R.L.Kotpal Rastogi Publications, Meerut- New Delhi.
8. Biology of Animals, C. P. Hickman, L. S. Roberts, and A. Larson, McGrawHill Company, New York.
9. Cell Biology and Molecular Biology, N. Arumugan, Saras Publications.
10. Cytology P.K.Gupta., S Chand & Co. Delhi.
11. Fundamental of Light Microscopy & Electron Imaging. Murphy D.B.,Wiley Liss.
12. Genetics, P.S. Verma & V.K. Agarwal, S.Chand & Co. Delhi.
13. Fundamentals of Genetics B.D.singh., Medtech Science Press.

# Shri Govind Guru University, Godhara

## B.Sc Zoology Semester I

### Major Paper II (Practical A)

**(Credit 04)**

1. **Classification of Non chordates animals up to class level giving reasons.**
    1. Protozoa - Amoeba, Paramoecium
    2. Porifera - Leucosolenia, Bath Sponge.
    3. Coelenterata - obelia, Aurelia, Sea Anemone.
    4. Platyhelminthes - Planaria, Liver fluke, Tape worm.
    5. Nematoda- Ascaris.
    6. Annelida - Nereis, Earthworm, Leech.

2. **Study of Hydra-I**
    1. Hydra W.M
    2. Hydra T.S
    3. Hydra L.S
    4. Hydra nematocysts in tentacles

3. **Study of Hydra-II**
    1. Budding in Hydra
    2. Hydra with gonads
    3. Ovary T.S
    4. Testis T.S

4. **Study of Earthworm.**
    1. External characters
    2. Digestive system
    3. Nervous system
    4. Reproductive system.

# Shri Govind Guru University, Godhara

## B.Sc Zoology Semester I

### Major Paper II (Practical B)

## 1. Study of temporary and permanent mounting of Earth worm.

1. Septal Nephridia
2. Body Setae
3. ovary
4. Testis
5. T.S Passing through Pharynx, Gizzard, Typhlosoler Region.

## 2. Study of Cytology.

1. Typical Animal Cell
2. Nucleus
3. Mitochondria
4. Endoplasmic Reticulum
5. Eukaryotic Ribosomes

## 3. Study of Microscope.

1. Simple Microscope
2. Compound Microscope

## 4. Study of Genetics.

1. Monohybrid Ratio 3 : 1
2. Dihybrid Ratio 9 : 3 : 3 : 1
3. In complete dominance 1 : 2 : 1
4. Codominance (1:2:1)
5. Multiple Alleles - ABO Blood groups
6. Polygenic inheritance 1 : 4 : 6 : 4 : 1 (skin color in man)
7. Lethal genes-Coat Color in Rat 2 : 1

## 5. Field Studies (Report writing and submission)

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# Shri Govind Guru University, Godhara

## B.Sc.Zoology Sem-I

## MINOR PAPER (THEORY)

## BASIC ASPECTS OF ZOOLOGY

**(Credit 02)**

**UNIT:1 Non-Chordate**

- Outline classification of non-chordates
- General characters of Phyla: Protozoa, Porifera, Coelenterta, Platyhelminthes, Nematoda, Annelida, Arthopoda, Mollusca and Echinodermata.

**UNIT:2 Cytology**

- Ultra structure of a typical Animal cell
- Ultra structure of Nucleus, Mitochondria, Endoplasmic reticulum, Eukaryotic Ribosome.

**UNIT:3 Genetics**

- Introduction to Genetics and gene
- Mendel's Law of Heredity
- Incomplete dominance (Gulbas plant-1:2:1), Co dominance (Coat color in Cattle - 1:2:1), Multiple alleles ABO Blood groups, Polygenic inheritance (Skin color in humans-1:4:6:4:1).

**REFERENCES:**


1. A Manual of Zoology Vol. I & II, Ekambarnath Ayyar and Ananthakrishnan, Viswanthan Pvt. Ltd. Madras.
2. BiologyofAnimals,C.P.Hickman,L.S.Roberts,andA.Larson,McGrawHillCompany,NewYork.
3. BiologyoftheInvertebrates,J.A.Pechenik,Tata-McGrawHillCompany,Ltd,NewDelhi.

4. IntegratedprincipalsofZoology,C.P.Hickman,L.S.Roberts,andA.Larson,McGrawHillCompany,NewYork.
5. InvertebrateZoologyJordan,E.L.and Verma,P.S,S.Chand&Co.NewDelhi
6. Invertebrate Zoology Dhami,P.S. and Dhami,J.K., SChand & Co.Delhi
7. Invertebrate Zoology R.L. Kotpal Rastogi Publications, Meerut-New Delhi
8. PrinciplesofAnatomyandPhysiology,GerardJ.Tortora, Wileypublications.
9. Cell Biology and Molecular Biology, N.Arumugan, Saras Publications.
10. Cytology P.K.Gupta., S Chand & Co.Delhi

# Shri Govind Guru University, Godhara

## B.Sc.Zoology Sem-I

## MINOR PAPER (PRACTICAL)

## BASIC ASPECTS OF ZOOLOGY

**(Credit 02)**

1. Classification of Non-chordate animals up to class level giving reasons:
   - (i) Protozoa – Amoeba
   - (ii) Porifera – Leucosolenia
   - (iii) Coelenterata – Sea Anemone
   - (iv) Platyhelminthes – Tapeworm
   - (v) Nematoda – Ascaris
   - (vi) Annelida – Nereis
   - (vii) Arthropoda – Butterfly
   - (viii) Mollusca – Octopus
   - (ix) Echinodermata – Starfish

2. Study of Cytology
   - (i) Typical Animal cell
   - (ii) Nucleus
   - (iii) Mitochondria
   - (iv) Endoplasmic Reticulum
   - (v) Eukaryotic Ribosomes

3. Study of Genetics.
   - (i) Monohybrid Ratio 3 : 1
   - (ii) Dihybrid Ratio 9 : 3 : 3 : 1
   - (iii) In complete dominance 1 : 2 : 1
   - (iv) Codominance (1:2:1)
   - (v) Multiple Alleles - ABO Blood groups
   - (vi) Polygenic inheritance 1 : 4 : 6 : 4 : 1 (skin color in man)

# SHRI GOVIND GURU UNIVERSITY, GODHARA

## B.SC.ZOOLOGY SEM-I

## MULTI DISCIPLINARY COURSE (THEORY)

## FUNDAMENTALS OF ZOOLOGY

**(Credit 02)**

**UNIT: 1 Cytology**

- Ultra structure of a typical Animal cell,
- Ultra structure of Nucleus, Mitochondria, Endoplasmic reticulum, Eukaryotic Ribosome.

**UNIT:2 Genetics**

- Introduction to Genetics and gene
- Mendel's Law of Heredity
- Incomplete dominance (Gulbas plant-1:2:1), Co dominance (Coat color in Cattle - 1:2:1), Multiple alleles ABO Blood groups, Polygenic inheritance (Skin color in humans-1:4:6:4:1).

**UNIT:3 Molecular Biology**

- Molecular structure of DNA (Watson & Crick's Model)
- Molecular structure and types of RNA
- Light Microscope: (i) Simple (ii) Compound
- Electron Microscope (i) SEM (ii) TEM

**REFERENCES:**


1. ACell Biology and Molecular Biology, N. Arumugan, Saras Publications.
2. Cytology P.K.Gupta., S Chand & Co. Delhi.
3. Fundamental of Light Microscopy & Electron Imaging. Murphy D.B., Wiley Liss.
4. Microscopy and Microtechnique. R. Marimuthu, MJP Publishers.
5. Fundamentals of Genetics B.D.singh., Medtech Science Press.
6. Genetics, P.S. Verma & V.K. Agarwal, S.Chand& Co. Delhi

# SHRI GOVIND GURU UNIVERSITY, GODHARA

## B.SC.ZOOLOGY SEM-I

## MULTI DISCIPLINARY COURSE (PRACTICAL)

## FUNDAMENTALS OF ZOOLOGY

**(Credit 02)**

1. Study of Cytology:
    (i) Typical Animal Cell
    (ii) Nucleus
    (iii) Mitochondria
    (iv) Endoplasmic Reticulum
    (v) Eukaryotic Ribosomes
2. Study of Genetics
    (i) Monohybrid Ratio 3 : 1
    (ii) Dihybrid Ratio 9 : 3 : 3 : 1
    (iii) Incomplete dominance 1 : 2 : 1
    (iv) Codominance (1:2:1)
    (v) Multiple Alleles - ABO Blood groups
    (vi) Polygenic inheritance 1 : 4 : 6 : 4 : 1 (skin color in man)
3. Study of molecular structure of DNA through chart and model.
4. Study of Microscopes:
    (i) Light microscope - (1) Simple (2) Compound
    (ii) Electron microscope (1) SEM (2) TEM

# Shri Govind Guru University, Godhra

## B.Sc. Zoology Semester II

## Theory Major Paper I

## BS23MJ2ZO1

## Non-Chordates, Animal Diversity, Cytology and Genetics

**(Credits 04)**

## Unit I: Non-chordates II and Animal Diversity

A. Salient Features & classification up to class giving reasons starting, from Arthropoda to Hemichordata giving suitable examples (As per practical syllabus).

B. *Plasmodium vivax*: Systematic position, Habits and Habitat

Life cycle: Asexual cycle, Sexual cycle and pathogenicity of Plasmodium.

## Unit II: Animal diversity (Non chordate)

Type Study: Cockroach (*Periplaneta americana*) - systematic position, Habits and Habitat, External characters, Digestive system, Circulatory System, Excretory system, Reproductive system, Nervous system and sense organ (compound eyes).

## Unit III: Cytology- II

Ultra structure of Plasma membrane (different models), Golgi body, Lysosome, Centriole/Basal bodies, Cilia/Flagella, and Cytoskeleton.

## Unit IV: Genetics- II

**[A]** Epistasis: Supplementary (recessive) genes – coat color in mice (9:3:4), Complementary (double recessive) genes –Flower color in *Odoratus lathyrus* (Pea plants) (9:7)

**[B]** Sex linked Inheritance: X-linked- color blindness and Eye color in Drosophila,
Y-linked Holandric genes (Baldness in men)

**[C]** Molecular structure of DNA (Watson & Crick's Model)
Molecular structure and types of RNA
Electron Microscope (i) SEM (ii) TEM

# REFERENCES:


1. A Manual of Zoology Vol. I & II, Ekambarnath Ayyar and Ananthakrishnan,Viswanthan Pvt. Ltd. Madras.
2. Biology of Animals, C. P. Hickman, L. S. Roberts, and A. Larson, McGrawHill Company, New York.
3. Biology of the Invertebrates, J. A. Pechenik, Tata-McGraw Hill Company,Ltd, New Delhi.
4. Integrated principals of Zoology, C. P. Hickman, L. S. Roberts, and A.Larson, McGraw Hill Company, New York.
5. Invertebrate Zoology Jordan, E. L. and Verma, P.S, S. Chand & Co. NewDelhi.
6. Invertebrate Zoology Dhami,P.S. and Dhami,J.K., S Chand & Co. Delhi.
7. Invertebrate Zoology R.L.Kotpal Rastogi Publications, Meerut- New Delhi.
8. Biology of Animals, C. P. Hickman, L. S. Roberts, and A. Larson, McGrawHill Company, New York.
9. Cell Biology and Molecular Biology, N. Arumugan, Saras Publications.
10. Cytology P.K.Gupta., S Chand & Co. Delhi.
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**B.Sc.ZoologySem-II**

**BS23MN2ZO1**

**MINOR PAPER (THEORY)**

**BASICASPECTSOFZOOLOGY-II**

**(Credit02)**

**UNIT:ICytologyII**

- UltrastructureofPlasmamembrane,DifferentmodelsofPlasmaMembrane
- UltrastructureofGolgibody,Lysosome,Centriole/Basalbodies, Cilia/Flagella, and Cytoskeleton

**UNIT:IIGenetics-II**

- Epistasis: Supplementary (recessive) genes – coat color in mice (9:3:4), Complementary(doublerecessive)genes–flowercolorin*Odoratuslathyrus* (Pea plants) (9:7)
- SexlinkedInheritance:X-linked-colorblindnessandEyecolorin Drosophila, Y-linkedHolandricgenes(Baldnessinmen)
- MolecularstructureofDNA(Watson&Crick'sModel)
- MolecularstructureandtypesofRNA
- ElectronMicroscope(i)SEM(ii)TEM

**REFERENCES:**


1. ACellBiologyandMolecularBiology,N.Arumugan,SarasPublications.
2. CytologyP.K.Gupta.,SChand&Co. Delhi.
3. FundamentalofLightMicroscopy&ElectronImaging.MurphyD.B.,WileyLiss.
4. MicroscopyandMicrotechnique.R.Marimuthu,MJP Publishers.
5. FundamentalsofGeneticsB.D.singh.,MedtechSciencePress.
6. Genetics,P.S.Verma& V.K.Agarwal,S.Chand&Co. Delhi

**ShriGovindGuruUniversity,Godhara**

**B.Sc.ZoologySem-II**

**MINOR PAPER (PRACTICAL)**

**BASICASPECTSOFZOOLOGY**

**(Credit02)**

## 1. StudyofCytology

1) Plasmamembrane
2) Golgibody
3) Lysosomes
4) Centriole/Basalbodies
5) Cilia/Flagella
6) Cytoskeleton

## 2. StudyofMolecularBiologyandGenetics

1) StructureofDNA(WatsonandCrick'smodel)
2) RecessiveEpistasis(9:3:4)
3) DoublerecessiveEpistasis(9:7)

## 3. StudyofSexLinkedinheritance

1) X-linked-colorblindness
2) Y-linked-Holandricgenes

## 4. StudyofElectronmicroscopes

1) SEM
2) TEM

# SHRI GOVIND GURU UNIVERSITY, GODHARA

## B.SC.ZOOLOGY SEM-II

## MULTI DISCIPLINARY COURSE (THEORY)

## BS23MD2ZO1

## FUNDAMENTALS OF ZOOLOGY-II

**(Credit 02)**

**UNIT: I Cytology- II**

- Ultra structure of Plasma membrane (different models), Golgi body, Lysosome, Centriole/Basal bodies, Cilia/Flagella, and Cytoskeleton.

**UNIT:2 Genetics-II**

- Structure and types of Chromosome based on position of centromere
- Epistasis: Supplementary (recessive) genes – coat color in mice (9:3:4),
  Complementary (double recessive) genes – flower color in *Odoratus lathyrus* (Pea plants) (9:7)
- Sex linked Inheritance: X-linked- color blindness and Eye color in Drosophila,
  Y-linked Holandric genes (Baldness in men)

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1. A Cell Biology and Molecular Biology, N. Arumugan, Saras Publications.
2. Cytology P.K.Gupta., S Chand & Co. Delhi.
3. Fundamentals of Genetics B.D.singh., Medtech Science Press.
4. Genetics, P.S. Verma & V.K. Agarwal, S.Chand& Co. Delhi

**SHRI GOVIND GURU UNIVERSITY, GODHARA**

**B.SC.ZOOLOGY SEM-I**

**MULTI DISCIPLINARYCOURSE (PRACTICAL)**

**FUNDAMENTALS OF ZOOLOGY**

**(Credit 02)**

## 1. Study of Cytology

**1)** Plasma membrane
**2)** Golgi body
**3)** Lysosomes
**4)** Centriole/Basal bodies
**5)** Cilia/Flagella
**6)** Cytoskeleton

## 2. Study of Molecular Biology and Genetics

**1)** Structure of chromosome
**2)** Recessive Epistasis (9:3:4)
**3)** Double recessive Epistasis (9:7)

## 3. Study of Sex Linked inheritance

**1)** X-linked- color blindness
**2)** Y-linked- Holandric genes