

**SHRI GOVIND GURU UNIVERSITY, GODHRA**

**B.Sc. ZOOLOGY - SEMESTER-IV**

**MAJOR COURSE - 1 (THEORY)**

**BS23MJ4ZO1**

**[Animal Diversity (Chordates), Parasitology, Genetics]**

**Total Credit - 04**

**04 Lectures/Week**

<b>UNIT</b>	<b>TOPICS</b>	<b>CREDIT</b>	<b>HOURS</b>
<b>Unit-I</b>	<ul style="list-style-type: none"><li>• General characters and classification of Protochordata, Cyclostomata, Pisces and Amphibia, starting from kingdom up to orders with reasons and examples (as per practical syllabus)</li><li>• Type study - Shark (<i>Scoliodon sorrakowah</i>) - Classification, External characters, Placoid scales, Digestive system, Circulatory system (Heart and Arterial system only), Nervous system (Brain), Receptors (Ampullae of Lorenzini, Internal ear), Urinogenital system</li></ul>	<b>1</b>	<b>15</b>
<b>Unit-II</b>	<ul style="list-style-type: none"><li>• Differences between Chondrichthyes and Osteichthyes</li><li>• Swim bladder in Fishes</li><li>• Accessory respiratory organs in Fishes</li><li>• Parental care in Fishes</li><li>• Parental care in Amphibians</li><li>• Neoteny in Amphibians</li></ul>	<b>1</b>	<b>15</b>
<b>Unit-III</b>	<ul style="list-style-type: none"><li>• General Introduction: Parasite, Host-Parasite relationship</li><li>• Types of Parasites: Endoparasites (Obligate, Facultative), Exoparasite</li><li>• Types of Hosts: Definitive, Intermediate, Reservoir</li><li>• Morphology, life cycle, pathogenesis, diagnosis &amp; prophylaxis of the following parasites:<ul style="list-style-type: none"><li>- Protozoan parasites: <i>Entamoeba histolytica</i>, <i>Leishmania donovani</i></li><li>- Helminthes parasites: <i>Taenia solium</i>, <i>Wuchereria bancrofti</i></li></ul></li></ul>	<b>1</b>	<b>15</b>

<b>Unit-IV</b>	<ul style="list-style-type: none"> <li>• Dominant Epistasis</li> <li>• Sex determination in animals <ul style="list-style-type: none"> <li>- Sex determination in Drosophilla (Genetic balance theory and XX, XO, XY method), Gynandromorph</li> <li>- Sex determination in Human</li> </ul> </li> <li>• Chromosome: Classification on the basis of Centromere's Location, Giant (polytene) Chromosome</li> <li>• Microscopy <ul style="list-style-type: none"> <li>- Phase contrast microscope</li> <li>- Fluorescence microscope</li> </ul> </li> </ul>	<b>1</b>	<b>15</b>
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**References:**

1. Textbook of Vertebrates, R.L. Kotpal, Rastogi Publication, Meerut.
2. Chordate Zoology, P. S. Dhami, and J. K. Dhami, S. Chand & Co., Delhi.
3. Jordan E. L. and Verma P. S. Vertebrate Zoology, S. Chand publishing. New Delhi.
4. Medical Parasitology, CK Jayram Paniker, Jaypee Brothers Medical Publishers, New Delhi.
5. Protozoa, R. L. Kotpal, Rastogi Publications, Meerut.
6. Helminthes, R. L. Kotpal, Rastogi Publications, Meerut.
7. An Introduction to Parasitology, P. N. Sharma, L. S. Ratnu, S. Chand & Co. Ltd., New Delhi.
8. Textbook of Genetics, Veerbala Rastogi, Kedar Nath Ram Nath, Meerut.
9. Genetics, P.S.Verma & V.K.Agarwal, S. Chand & Company, Delhi.
10. Cell Biology, C. B. Power, Himalaya Publishing House.

**SHRI GOVIND GURU UNIVERSITY, GODHRA**

**B.Sc. ZOOLOGY - SEMESTER-IV**

**MAJOR COURSE - 2 (THEORY)**

**BS23MJ4ZO2**

**[Animal Diversity (Chordates), Physiology, Evolution]**

**Total Credit - 04**

**04 Lectures/Week**

<b>UNIT</b>	<b>TOPICS</b>	<b>CREDIT</b>	<b>HOURS</b>
<b>Unit-I</b>	<ul style="list-style-type: none"><li>• General characters and classification of Reptilia, Aves and Mammalia, starting from kingdom up to orders with reasons and examples (as per practical syllabus)</li><li>• Type study – Garden Lizard (<i>Calotes versicolor</i>): Classification, External characters, Digestive system, Circulatory system (Heart, Arterial system, Venous system), Nervous system – Brain, Urinogenital system</li></ul>	<b>1</b>	<b>15</b>
<b>Unit-II</b>	<ul style="list-style-type: none"><li>• Temporal fossae in Reptiles</li><li>• Identification of venomous and non-venomous snakes<ul style="list-style-type: none"><li>- Venomous: Russel's viper, Krait, Cobra, King Cobra, Marine Snake</li><li>- Non-venomous: Boa, Python, Rat snake</li></ul></li><li>• Dinosaurs (Brontosaurus, Triceratops, Tyrannosaurus, Dimetrodon, Stegosaurus, Pteranodon, Ichthyosaurus, Iguanodon)</li><li>• Animal adaptations: Cursorial, Fossorial, Arboreal, Volant, Desert, Deep sea</li></ul>	<b>1</b>	<b>15</b>
<b>Unit-III</b>	<ul style="list-style-type: none"><li>• Body fluids: Introduction, Significance, Compartments, Composition</li><li>• Dehydration, Water Intoxication (Overhydration)</li><li>• Composition of Cerebrospinal fluid (CSF)</li><li>• Composition of Milk</li><li>• Physiology of Digestion (Ingestion, Digestion, Absorption, Assimilation, Egestion).</li><li>• Digestion of carbohydrates, protein and lipids.</li></ul>	<b>1</b>	<b>15</b>

<b>Unit-IV</b>	<ul style="list-style-type: none"> <li>• Evolutionary theories <ul style="list-style-type: none"> <li>- Origin of life</li> <li>- Lamarckism</li> <li>- Darwinism</li> <li>- Neo Darwinism</li> </ul> </li> <li>• Phylogeny of Horse</li> <li>• Source of variation <ul style="list-style-type: none"> <li>1. Gene mutation</li> <li>2. Chromosomal mutation <ul style="list-style-type: none"> <li>a. Change in number</li> <li>b. Change in structure</li> </ul> </li> </ul> </li> </ul>	<b>1</b>	<b>15</b>
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1. Textbook of Vertebrates, R.L. Kotpal, Rastogi Publication, Meerut.
2. Chordate Zoology, P. S. Dhami, and J. K. Dhami, S. Chand & Co., Delhi.
3. Jordan E. L. and Verma P. S. Vertebrate Zoology, S. Chand publishing. New Delhi.
4. Principles of Anatomy and Physiology, Tortora and Grabowski, Harper Collins College Publications.
5. Essentials of Medical Physiology, K. Sembulingam and Prema Sembulingam, Jaypee publications.
6. Animal Physiology and Related Biochemistry, H. R. Singh, Shobhan Lal Nagin Chand & Co., Educational Publishers, Jalandhar.
7. Veer Bala Rastogi (2017) Organic Evolution. Med Tech.
8. Evolution. Hall, B. K. and Hallgrimsson, B. IV edition. Jones and Bartlett Publishers.
9. Evolution. Futuyma, Douglas J. and Kirkpatrick Mark. (4th Edition) Sinauer.

**SHRI GOVIND GURU UNIVERSITY, GODHRA**  
**B.Sc. ZOOLOGY - SEMESTER-IV**  
**MAJOR COURSE - Practical-A**  
**BS23MJ4ZO3**  
**(Based on Major Course - 1)**  
**[Animal Diversity (Chordates), Parasitology, Genetics]**

**Total Credit - 02**

**LIST OF PRACTICALS**

**I. (A) ANIMAL DIVERSITY (Chordates) – Systematics:**

Identification & Classification of following animals up to Orders, giving reasons:

1. Protochordata: Amphioxus, Doliolum, Ascidian.
2. Cyclostomata: Lamprey, Hagfish.
3. Pisces: Rohu, Sting ray fish, Electric ray fish, Sea horse, Suckerfish, Eel.
4. Amphibia: Ichthyophis, Salamander, Hyla.

**(B) STUDY OF SHARK (*Scoliodon sorrakowah*):**

1. Study of external characters.
2. Study of Digestive system, Arterial system, Urinogenital systems, Brain.
3. Study of Placoid scales, Membranous Labyrinth, Ampulla of Lorenzini

**II. ANIMAL DIVERSITY (Chordates):**

Study by charts/models/specimens to learn peculiarities of:

1. Swim bladder in Fishes
2. Accessory respiratory organs in Fishes
3. Parental care in Fishes (Male Hippocampus, Male Kurtus, Male Arius, Female Tilapia).
4. Parental care in Amphibians (Alytes, Pipa, Rhacophorus, Hyla, Rhinoderma).

**III. PARASITOLOGY:**

1. Study of *Entamoeba histolytica*, *Leishmania donovani*, *Taenia solium*, *Wuchereria bancrofti* and their life stages through permanent slides / specimens / photographs.

**IV. GENETICS:**

1. Dominant Epistasis
2. Sex determination in *Drosophila*
3. Sex determination in Human
4. Study of polytene chromosome through chart
5. Phase contrast microscope
6. Fluorescence microscope

**SHRI GOVIND GURU UNIVERSITY, GODHRA**  
**B.Sc. ZOOLOGY - SEMESTER-IV**  
**MAJOR COURSE - Practical-B**  
**BS23MJ4ZO3**  
**(Based on Major Course - 2)**  
**[Animal Diversity (Chordates), Physiology, Evolution]**

**Total Credit - 02**

**LIST OF PRACTICALS**

**I. (A) ANIMAL DIVERSITY (Chordates) – Systematics:**

Identification & Classification of following animals up to Orders, giving reasons:

1. Reptilia: Tortoise, Tuatara, House Gecko, Cobra, Python, Crocodile, Gavialis.
2. Aves: Ostrich, Emu, Penguin, Flamingo, Peacock, Parrot, Wood pecker, Crow, Sparrow.
3. Mammalia: Koala, Kangaroo, Bat, Lion, Seal, Blue whale, Horse, Rat, Rabbit, Chimpanzee.

**(B) STUDY OF GARDEN LIZARD (*Calotes versicolor*):**

1. Study of external characters.
2. Study of Digestive system, Heart, Arterial system, Venous system, Brain, Urinogenital system.

**II. ANIMAL DIVERSITY (Chordates):**

Study by charts/models/specimens to learn peculiarities of:

1. Temporal fossae
2. Identification of venomous and non-venomous snakes by charts:
  - Venomous: Russel's viper, Krait, Cobra, King Cobra, Marine Snake
  - Non-venomous: Boa, Python, Rat snake
3. Dinosaurs (Brontosaurus, Triceratops, Tyrannosaurus, Iguanodon, Stegosaurus, Pteranodon, Ichthyosaur, Plesiosaur)
4. Animal adaptations:
  - i. Cursorial: Ostrich, Horse
  - ii. Arboreal: Squirrel, Hyla, Chameleon
  - iii. Volant: Bat, Birds
  - iv. Desert: Phrynosoma, Camel
  - v. Deep sea: Blue whale, Sole fish

**III. PHYSIOLOGY:**

1. To study the action of Salivary Amylase on Starch.

**IV. EVOLUTION:**

1. Study of Evolution of horse through charts/models
2. Study of examples supporting Lamarkism and Darwinism