

**BHAKTA KAVI NARSINH MEHTA**  
**UNIVERSITY**  
**JUNAGADH**



FACULTY OF SCIENCE

[Three Years (6 Semesters) Full Time Course]

**ZOOLOGY SYLLABUS**

**2018 – 19**

**Syllabus of Sem-II**

Bhakta KaviNarsinh Mehta University  
Junagadh – 362263.  
Gujarat, India.

Sr. No.	Name Of Programme	B.Sc. ZOOLOGY	
1	Title Of Paper	(In Sem -I) Non Chordates : Systematics, Forms & Functions, Cell biology & Histology, Ecology, Fisheries Biology & Wild life Biology	( In Sem -II) Chordate: Systematic, Forms & Functions, Genetics, Evolution, Physiology, Embryology, Applied Zoology, Reproductive Biology and Functional Anatomy of chordates
2	Theory Credit	4	4
3	Practical Credit	3	3
4	Total Credit	7	7
5	External Marks Of Theory	70	70
6	Internal Marks Of Theory	30	30
7	Total Marks Of Theory	100	100
8	External Marks Of Practical	35	35
9	Internal Marks Of Practical	15	15
10	Total Marks Of Practical	50	50
11	Grand Total	150	150
12	External Exam Time Duration	2½ Hours	2½ Hours

Course / Paper Code					
13	Year	1	6	1	6
14	Faculty	0	3	0	3
15	Subject	0	4	0	4
16	UG/PG	0	1	0	1
17	Semester	0	1	0	2
18	Paper	0	1	0	2
19	Core	0	0	0	0

**EXAMINATION CODING SYSTEM**

**BHAKTA KAVI NARSINH MEHTA**  
**UNIVERSITY**  
**JUNAGADH**



**ZOOLOGY**  
**SYLLABUS SEM-II**

[SYLLABUS FOR THE CHOICE BASED CREDIT SYSTEM (CBCS)]

(F.Y. B.Sc.)

**SEMESTER II – PAPER – Z-02**

**Revised Syllabus**

**INFORCE FOR JUNE – 2018**

**BHAKTA KAVI NARSINH MEHTA**  
**UNIVERSITY**  
**JUNAGADH**

[SYLLABUS FOR CHOICE BASED CRADIT SYSTEM (CBCS)]

INFORCE FORM JUNE – 2018

**SUBJECT: ZOOLOGY**

SEMESTER – II

ZOOLOGY PAPER – Z – 02

Chordate: Systematic, Forms & Functions, Genetics, Evolution, Physiology, Embryology, Applied Zoology, Reproductive Biology and Functional Anatomy of chordates

**BHAKTA KAVI NARSINH MEHTA  
UNIVERSITY  
JUNAGADH  
(CBCS Syllabus)  
SEMESTER - II  
ZOOLOGY  
PAPER – Z-02**

Chordate: Systematic, Forms & Functions, Genetics, Evolution, Physiology, Embryology, Applied Zoology, Reproductive Biology and Functional Anatomy of chordates

**UNIT- 1: SYSTEMATIC, FORMS AND FUNCTIONS IN ANIMALS:**

**1.1** Salient features and classification up to class in Chordates with examples.

**1.2** General structure and morphology with functional anatomy of following type.

**(I) PROTOCHORDATA: Type study : Amphioxus**

- (i) External Features
- (ii) Digestive system
- (iii) Endostyle
- (iv) T.S. through Pharynx region

**(II) Embryonic development of Amphioxus:**

- (i) Sperm
- (ii) Ovum
- (iii) Fertilization
- (iv) Blastulation
- (v) Gastrulation

## **UNIT- 2: GENETICS &EVOLUTION:**

### **2.1 MULTIPLE ALLELES:**

- (i) Characters of multiple alleles.
- (ii) The 'C' gene in Rabbit (Coat colour).
- (iii) A, B, AB and O blood groups in Humans.
- (iv) 'Rh' factor and Erythroblastosis foetalis.

### **2.2 EVOLUTION:**

- (i) **Introduction to Evolutionary Theories:** Lamarckism, Darwinism, Neo-darwinism
- (ii) **Direct Evidences of Evolution:** Types of fossils, Incompleteness of fossil record, Phylogeny of Horse.

## **UNIT- 3: PHYSIOLOGY & EMBRYOLOGY:**

### **3.1 DIGESTION:**

- (i) Physiology of digestion in the alimentary Canal.
- (ii) Absorption of carbohydrates, proteins, lipids.

### **3.2 BLOOD:**

- (i) Composition of blood.
- (ii) Physiology of coagulation of blood

### **3.3 SPERMATOGENESIS.**

### **3.4 OOGENESIS**

## **UNIT- 4: APPLIED ZOOLOGY:**

### **4.1 A study of general structure and characters of following pathogenic animals:**

- (i) Entamoeba.
- (ii) Trypanosoma.
- (iii) Filarial worm.
- (iv) Guinea worm.
- (v) Round worm.
- (vi) Pin worm.

### **4.2 A study of general characters and structure of following harmful parasitic Insects of mankind:**

- (i) Human louse.
- (ii) Bed bug.

(iii) Flea.

**4.3 Poultry science:**

- (i) A general account of poultry science.
- (ii) A type of poultry house.
- (iii) Different apparatus used in poultry house.
- (iv) A visit of poultry farm.

**4.4 A study of fresh water aquarium.**

**UNIT-5: REPRODUCTIVE BIOLOGY & FUNCTIONAL ANATOMY OF CHORDATES**

**5.1 Menstrual cycle**

**5.2 Estrus cycle**

**5.3 Integumentary System:** Derivatives of integument: Glands and digital tips, Nails, Claws, Horns, Hoofs

**5.4 Circulatory system:** Origin & Evolution of heart.



## PRACTICAL RELATED TO PAPER – Z-02

### **Practical: 1 :** Identification and classification of Chordate animals.

- (i) Sub-Phylum : Urochordata : Herdmania
- (ii) Sub-Phylum: Cephalochordata: Amphioxus.
- (iii) Class: Cyclostomata : Petromyzon.
- (iv) Super Class: Pisces : Shark, Electric Ray, Eel, Sea-horse.

### **Practical: 2 :** Identification and classification of Chordate animals.

- (i) Class: Amphibia : Ichthyophis, Bufo, Salamander.
- (ii) Class : Reptiles : Turtle, Draco, Chameleon, Mabouia (Skink), Varanus, Snake, Crocodile.
- (iii) Class: Aves : Weaver Bird, Parrot, Owl, Wood pecker.
- (iv) Class : Mammal : Duck-bill, Kangaroo, Hedge hog, Bat, Dolphin

### **Practical: 3 :** Forms and Function in Animals :

- (i) Amphioxus: External characters
- (ii) Amphioxus: Lateral view with digestive system
- (iii) Amphioxus: Food & feeding mechanism with endostyle
- (iv) T.S. of pharynx in Amphioxus.

-By slides or charts or Multimedia.

### **Practical: 4 :** Embryology of Amphioxus :

- (i) Sperm
- (ii) Ova
- (iii) Fertilization
- (iv) Cleavage
- (v) Blastulation
- (vi) Gastrulation

-By slides or charts or Multimedia.



**Practical: 5 :** Examples of Genetics.

Examples should be taken from theory portion of Multiple Alleles only.

**Practical: 6 :** To determine own blood group & Rh factor.

**Practical: 7 :** To study of following Evolutionary charts / models/ pictures:

- (i) Study of fossil evidence from plaster cast models and pictures
- (ii) Study of homology and analogy from suitable specimens/ pictures
- (iii) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors
- (iv) Darwin's finches with diagrams/ cut outs of beaks of different species.

**Practical: 8 :** Test of salivary Amylase for digestion of Starch.

**Practical: 9 :** General Emryology:

Study of oogenesis and spermatogenesis by chart or model.

**Practical: 10 :** Study of following pathogenic animals.

- (i) Entamoeba
- (ii) Trypanosoma
- (iii) Filaria worm
- (iv) Guinea worm
- (v) Ascarislumbricoides (Round worm)
- (vi) Enterobiusvermicularis (Pin-worm)

**Practical: 11 :** Study of following harmful parasitic insects.

- (i) Human louse.
- (ii) Bed bug.
- (iii) Flea.

**Practical: 12 :** Study of following poultry apparatus.

- (i) Types of poultry farms
- (ii) Apparatus used in poultry farm: Feeder, Brooder, Waterer.  
-By photographs, charts or by Multi-media.

**Practical: 13 :** To study of Integumentary derivatives: Glands, Claws, Hoofs, Nails, Horns.

**Practical: 14 :** Origin & Evolution of heart and comparative account of it.

**Practical: 15 :** Visit to poultry farm/ Pathology Laboratory/ Natural History Museum And Submission of Report.

**Practical: 16 :** Study of fresh water aquarium



## DISTRIBUTION OF UNITS

### SEMESTER – II

PAPER – Z-02			
Unit No.	Unit Title	Theory Period	Marks.
Unit : 1	Systematics, Forms and Functions	15	14
Unit : 2	Genetics & Evolution	14	14
Unit : 3	Physiology & Embryology	13	14
Unit : 4	Applied Zoology	09	14
Unit : 5	Reproductive Biology & Functional Anatomy of chordates	14	14
TOTAL :		<b>65</b>	<b>70</b>

- Above statement concerned to only Theory portion of the paper.
- Above mentioned third column 'Theory Period' indicates total number of theory lectures per unit.
- Total syllabus should be completed within 65 theory lectures.
- Each and every units are carries equal 14 marks.
- Total marks for theory examination are 70 marks.
- **PAPER SETTER MUST FOLLOW THE UNIT WISE MARK SETUPS.**

**BHAKTA KAVI NARSINH MEHTA UNIVERSITY  
JUNAGADH  
THEORY EXAMINATION  
SEMESTER – II  
ZOOLOGY**

(Based on Paper – Z-02)

Time: 2½ Hours

Total Marks: 70

**Instructions:**

1. Illustrate your answer with neat and labeled diagrams.
2. Figure to the right side indicates full marks of questions.

<b>QUESTION 1 – UNIT 1</b>		
<b>Q 1 A</b>	<i>Objective type questions</i>	<b>4 Marks</b>
<b>Q 1 B</b>	<i>Answer in brief (Any 1 out of 2)</i>	<b>3 Marks</b>
<b>Q 1 C</b>	<i>Write a note on (Any 1 out of 2)</i>	<b>7 Marks</b>
<b>QUESTION 2 – UNIT 2</b>		
<b>Q 2 A</b>	<i>Objective type questions</i>	<b>4 Marks</b>
<b>Q 2 B</b>	<i>Answer in brief (Any 1 out of 2)</i>	<b>3 Marks</b>
<b>Q 2 C</b>	<i>Write a note on (Any 1 out of 2)</i>	<b>7 Marks</b>
<b>QUESTION 3 – UNIT 3</b>		
<b>Q 3 A</b>	<i>Objective type questions</i>	<b>4 Marks</b>
<b>Q 3 B</b>	<i>Answer in brief (Any 1 out of 2)</i>	<b>3 Marks</b>
<b>Q 3 C</b>	<i>Write a note on (Any 1 out of 2)</i>	<b>7 Marks</b>
<b>QUESTION 4 – UNIT 4</b>		
<b>Q 4 A</b>	<i>Objective type questions</i>	<b>4 Marks</b>
<b>Q 4 B</b>	<i>Answer in brief (Any 1 out of 2)</i>	<b>3 Marks</b>
<b>Q 4 C</b>	<i>Write a note on (Any 1 out of 2)</i>	<b>7 Marks</b>
<b>QUESTION 5 – UNIT 5</b>		
<b>Q 5 A</b>	<i>Objective type questions</i>	<b>4 Marks</b>
<b>Q 5 B</b>	<i>Answer in brief (Any 1 out of 2)</i>	<b>3 Marks</b>
<b>Q 5 C</b>	<i>Write a note on (Any 1 out of 2)</i>	<b>7 Marks</b>
<b>TOTAL MARKS : 70 TOTAL TIME : 2½ HOURS</b>		

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**PRACTICAL EXAMINATION**

**SEMESTER – II**

**ZOOLOGY**

(Based on Paper – Z-02)

**Time :3 Hours**

**Total Marks : 35**

- Que – 1 : Sketch and label \_\_\_\_\_ system of Amphioxus. [05]  
(Practical-3)
- Que – 2 : Sketch and label \_\_\_\_\_ (Practical-4 &9) OR  
Do as per instruction & show it to examiner.(Practical-6 & 8) [04]
- Que – 3 : Solve the given example of Genetics. (Practical- 5)  
Any two examples, Each from Coat Colour of Rabbit & Blood Group. [04]
- Que – 4 : Identify and Describe about comparative account of it. (Practical-14) [04]
- Que – 5 : Write as per instruction. [12]  
(A) Identify and classify giving reasons.(Lower chordate)  
(B) Identify and classify giving reasons. (Higher Chordate)  
(C) Identify and describe. (Practical-8)  
(D) Identify and describe. (Practical-10 or 11)  
(E) Identify and describe. (Practical-12)  
(F) Identify and describe. (Practical-13)
- Que – 6 : Tour Report & Viva – voice. [03]
- Que – 7 ; Certified Journal. [03]

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**List of Slides, Specimens, Charts, Models &  
Photographs**

**SEMESTER – II**

**ZOOLOGY**

(Based on Paper – Z-02)

**LIST OF SLIDES:**

- (1) T.S. of Pharynx in Amphioxus. [Practical-3,(IV)] , Also available in Chart.
- (2) All slides of Embryology of Amphioxus. [Practical-4],Also available in Chart.
- (3) Slides of Pathogenic animals-Entamoeba, Trypanosoma, Pin-Worm. [Practical-10]
- (4) Slides of harmful Parasitic Insects-Human louse, Bed-bug, Flea [Practical-11]

**LIST OF SPECIMENS:**

- (1) All animal specimens from Sub-Phylum-Hemi Chordata to Class-Mammals. [Practical-1&2]
- (2) Specimens of pathogenic animals- Filaria-worm, Guinea-worm. Ascaris. [Practical-10]
- (3) Integumentary Derivatives- Glands, Claws, Hoops, Nails & Horns. [Practical-13], Also available in chart.

**LIST OF CHARTS/MODELS/PHOTOGRAPHS:**

- (1) Amphioxus: External characters, Lateral view with Digestive System, Food & Feeding Mechanism with Endostyle, T.S. of Pharynx [Practical-3].

- (2) Evolutionary Study of Fossil evidence, Homology and Analogy, Phylogeny of Horse, Darwin's Finches. [Practical-7]
- (3) Spermatogenesis & Oogenesis. [Practical-9]
- (4) Types of Poultry Farms, Feeder, Brooder & Waterer as Poultry apparatus. [Practical-12], Also available in Instruments.
- (5) Integumentary Derivatives- Glands, Claws, Hooves, Nails & Horns. [Practical-13]
- (6) Heart: Origin, Evolution & Comparative account of it. [Practical-14]

### **LIST OF INSTRUMENTS/CHEMICALS & MATERIALS:**

- (1) Light Microscope
- (2) Dissection Box, Serum A, Serum B, Serum, Spirit & Cotton. [Practical-6]
- (3) Saliva, Iodine(I<sub>2</sub>), Starch-Solution, Cavity box, Dropper. [Practical-7]
- (4) Types of Poultry Farms, Feeder, Brooder & Waterer as Poultry apparatus. [Practical-12]

## REFERENCE BOOKS

### SEMESTER – II

#### List of Books for Unit -1

- 1 : Chordate Zoology.....E.L.Jordan&Dr.P.S.Verma
- 2 : Modern textbook of Zoology Vertebrates .....R.L.Kotpal.
- 3 : Chordate Embryology.....P.S.Verma&V.K.Agraval
- 4 : A manual of practical Zoology, Vertebrates.....P.S.Verma
- 5 : Practical Zoology, Vertebrates.....S.S.Lal

#### List of Books for Unit - 2

- 6 : Principal of Genetics.....Gardner.
- 7 : Genetics.....P.S.Varma&V.K.Agrawal.
- 8 : Problems on Genetics, Molecular Genetics & Evolutionary Genetics....  
.....Dr. P.K.Banergee.
- 9 : Genetics & Biostatistics.....Meyyan.
- 10 : Cell Biology, Genetics, Molecular Biology, Evolution&  
Ecology.....P.S.Verma&V.K.Aggarval.
- 11 : Cytology, Genetics & Evolution.....P.K.Gupta
- 12 : Organic Evolution .....Dr. N. Arumugam.
- 13 : Evolution.....VeerbalaRastogi.

#### List of Books for Unit - 3

- 14 : Animal Physiology.....P.K.Gupta.
- 15 : Animal Physiology.....V.K.Agrawal.
- 16 : Animal Physiology.....M.P.Arora
- 17 : A textbook of Animal Physiology.....TyagiPrasum
- 18 : Human Physiology, Vol- I & II.....Chatterjee C.C.
- 19 : A text book of Animal Physiology.....A.K.Berry&K.Berry
- 20 : Animal Physiology & Bio-Chemistry.....R.A.Agrawal&  
Anil k. Shrivastva&Kaushal Kumar



21 : Chordate Embryology.....P.S.Verma&V.K.Agraval

List of Books for Unit – 4

22 : Applied Zoology.....Arumugam, T. Murugan, Rajeshwar, RamPrabhu.

23 : Economic Zoology.....Shukla&Upadhyay.

24 : Economic Zoology.....Venkitaraman.

List of Books for Unit – 5

25 : Reproductive Physiology.....A.V.Nalbandow.

26 : Chordate Zoology.....E.L.Jordan&Dr.P.S.Verma

27 : Modern textbook of Zoology Vertebrates .....R.L.Kotpal.

28 : Animal Physiology.....M.P.Arora

29 : Animal Physiology & Bio-Chemistry.....R.A.Aggrawal&  
Anil k. Shrivastva&Kaushal Kumar

List of Books for Viva-Voice

1 : Practical Zoology Invertebrate.....S.S.Lal

2 : Practical Zoology Vertebrate.....S.S.Lal

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