

Krantiguru Shyamji Krishna Verma

# Kachchh University

Mundra Road

Bhuj – 370001

## SYLLABUS

**B.Sc Semester III: (Three)**

# ZOOLOGY

Two papers:

<b>Semester – III Two papers</b>
<b>CEZO-303: Animal Diversity (Chordata) and Cytology.</b>
<b>CEZO-304: Ecology, Wildlife and Environmental issues.</b>



**UNIT I: Animal diversity (Chordata)**

**(15 Marks)**

Salient features and classification of chordates from Kingdom to Order,

1. Amphibia: Frog, Toad, Hyla, Salamander, Caecilians (Ichthyophis)
2. Pisces: Shark, Rohu, Ray fish, Mudskipper, Cat fish, Catla, Sting ray, Sea horse, Suckerfish, Eel.

(The said animals should be taught in practical while classification, characteristics of upto order level, animals included in order as well as habitat should be included in theory)

**UNIT II: Type study – Chordata (through charts/ models/ multimedia)**

**(15 Marks)**

1. Shark (*Scoliodon sorrakowah*): External characters, digestive system, circulatory system, Nervous system, Urinogenital system  
-Sense organs (Membranous labrynth and Ampulla of Lorenzini)
2. Comparison of Elasmobranch and Bony fishes

**UNIT III: General Topics**

**(15 Marks)**

1. Types of scales in fish
2. Types of fins in fish
3. Common snakes of India

3.1. Identification and study of Venomous and non-venomous snakes of India.

*Venomous snakes: Cobra, King cobra, Krait, Russel's and saw scaled viper, Sea snakes.*

*Non-venomous: Rat snake, python, wolf snake, checkered keel back.*

*Type of snake venoms: Neurotoxic, hemotoxic and neuro-hemo toxic*

3.2. Snake bite mechanism, Primary treatment and Remedies

**UNIT IV: Cytology**

**(15 Marks)**

- Cytoskeleton (Definition, Importance, type of cytoskeleton, function)
- Lysosomes: Ultra structure, types and function
- Cancer cells : General characteristics and nature, potential carcinogens
- Programmed cell death: In general



## **Reference Books:**

**Modern Text book of Vertebrates** by R. L. Kotpal, Rastogi Publication, Meerut

**Chordata Zoology** by E. L Jordan and P. S. Verma

**Integrated Principles of Zoology** by Hickman

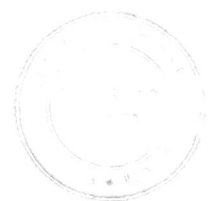
**Cellular and Molecular Biology** by De Robertis

**Cytology** by P. K. Gupta, S. Chand & Company, Delhi

**Textbook of Cytology** by Dalela and Verma

**Jiv-Vigyan** by Nirav Prakashan

**Sankes of India** By Wittecker



# The Structure of the Question Paper for the University exam

Semester III (Zoology) Paper no: CEZO303

Total Mark: 60 (Total 4 units each carries 15 Marks)

Total Number of Question: 04

Question No.	Sub Question	Question Type	Mark
Question 1	A	*Short question (no internal option)	05
Unit I	B	Descriptive Questions with Internal Option	10
Question 2	A	Short question (No internal Option)	05
Unit II	B	Descriptive Questions with Internal Option	10
Question 3	A	Short question (No internal Option)	05
Unit III	B	Descriptive Questions with Internal Option)	10
Question 4	A	Short question (No internal Option)	05
Unit IV	B	Descriptive Questions with Internal Option	10

**Note:** Short questions may include: one to two line question/ definition/ drawing small figures/ filling the blanks/ multiple choice question/ match the pairs etc)

- The examination pattern of the university is 60% external and 40% internal
- Types of question for section 'A' may include: one to two line question/ definition/ drawing small figures/ filling the blanks/ multiple choice question/ match the pairs etc.
- Each theory paper will have 4 lectures in a week and a practical will have 6 lectures per batch in a week.
- Minimum length of the submission is printed five A4 size pages.



# KSKV Kachchh University, Bhuj - Kachchh

## Zoology Semester III

### Paper No.CEZO– 303: Animal Diversity (Chordata) and Cytology

#### (PRACTICALS)

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Identification and classification upto order giving reasons (Practical 1-2)

Practical 1: Classification of Class Amphibia: Frog, Bufo, Hyla, Salamander, Ichthyophis, Axolotal larva.

Practical 2: Classification of Super Class Pisces: Shark, Rohu, Ray fish, Mudskipper, Cat fish, Hippocampus, Eel, suckerfish.

(Along with classification scientific name, short description and habitat should be given)

Practical 3: Type study (Chordata). Study of Shark (*Scoliodon sorrakowah*) (Using charts/multimedia/models)

3.1 Study of external characteristics of shark

3.2 Study of digestive system of shark

3.3 Study of circulatory system of shark

3.4 Study of Nervous system of shark

3.5 Mountings (Membranous labyrinth and Ampulla of Lorenzini)

Practical 4: Study of scales in fishes (through charts/slides)

Practical 6: Study of fins in fishes (Through charts and specimens)

Practical 7: To study poisonous and non poisonous snakes (Through charts, keys and specimens – as per theory) Cobra, Krait, saw scaled viper, Russel's viper, Checkered keel back, rat snake.

*Local excursion/self study – with report*

*Journal submission*

#### ***Instructions:***

- ***The Zoological excursion is compulsory to study the ecosystem, Animal behavior and their life style for the students.***
- Excursion report is mandatory for all the students and marks will be calculated in practical examination
- This is compulsory to record laboratory work in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.



**KSKV Kachchh University, Bhuj - Kachchh**  
**(SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION)**

**ZOOLOGY (303): Animal Diversity (Chordata) and Cytology**

**Date:** \_\_\_\_\_

**Total Marks: 30**

**Time: 4 hours**

Q.1 Draw/Demonstrate & explain the \_\_\_\_\_ system of the given animal to examiner. **07**

Q.2 Show how to prepare temporary mounting of \_\_\_\_\_ from shark and show to examiner. **03**

Q.3 Identify specimens 1 to 6 as per instructions: **12**

1. Identify and classify giving reason
2. Identify and classify giving reason
3. Identify and describe
4. Identify and do as directed
5. Identify and do as directed
6. Identify and do as directed

Q.4. Viva voice **03**

Q. 5 Report /submission **02**

Q.5 Journal **03**



**KSKV Kachchh University, Bhuj - Kachchh**  
**Zoology Syllabus as CBCS System**

**Semester -III**

**Paper 304 (Theory)**

*Total Marks-60*

**CEZO- 304: Ecology, Wildlife and Environmental issues**

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**UNIT I: Ecology**

**(15 Marks)**

- 1 Study of different ecosystems; (Characteristics, zonation, flora and fauna, community pattern, trophic levels)
  - Forest ecosystem
  - Grassland ecosystem
  - Aquatic ecosystem (Lentic and Lotic)
  - Marine ecosystem
2. Succession in aquatic ecosystem and terrestrial ecosystem
3. Key stone species, Umbrella species, and Flagship species (with examples of each)

**UNIT II: Wildlife Biology**

**(15 Marks)**

1 National Park and Sanctuaries

Example studies: Gir National Park, Marine National Park, Velavadar National Park, Jim Corbett National Park, Wild Ass Sanctuary.

2. Tools for Wildlife study: Binoculars, Cameras, Radio transmitters/ receivers, Tranquilizers (guns and darts), Camera traps.

3. Wildlife Conservation:

- Indian Wildlife Act

- IUCN Red list categories

- Endangered Fauna (With Scientific name and status): Asiatic lion, Indian Wild ass, Tiger, Leopard, Great Indian Bustard, One horned Rhino, Gangetic dolphin, Vultures)

**(15 Marks)**

**UNIT III: Current Environmental Issues**

1. Deforestation, Habitat destruction, Over exploitation of resources.

2. Global Warming and Green House effect: Causative gases, Climate change, possible effects, Sea level change, Ozone depletion

i. Plastic pollution: Effect of plastic on ecosystem, effect on animals. Best practices.

3. Rain Water Harvesting (Importance of RWH, various methods of RWH)



#### **UNIT IV: Basic Biostatistics**

(15 Marks)

1. Importance of Biostatistics in biological studies
2. Mean , Median, Mode
3. Standard deviation

#### **Reference Books:**

**Threatened animals of India**, B. K. Tikader, ZSI, Calcutta

**T. C. Cell Biology**, Genetics, Evolution and Ecology

**Wildlife of India**, Mark E. Trisch, HarperCollins Pub.

**Modern Text book of Vertebrates** by R. L. Kotpal

**Fish and Fisheries of India**, V. B. Jhingran, Hindustan Pub., Meerut





# The Structure of the Question Paper for the University exam

Semester III (Zoology) Paper no: CE ZO 304

Total Mark: 60 (Total 4 units each carries 15 Marks)

Total Number of Question: 04

Question No.	Sub Question	Question Type	Mark
Question 1 Unit I	A	*Short questions (no internal option)	05
	B	Descriptive Questions with Internal Option	10
Question 2 Unit II	A	*Short questions (No internal Option)	05
	B	Descriptive Questions with Internal Option	10
Question 3 Unit III	A	*Short questions (No internal Option)	05
	B	Descriptive Questions with Internal Option	10
Question 4 Unit IV	A	*Short questions (No internal Option)	05
	B	Descriptive Questions with Internal Option	10

**Note:** Short questions may include: one to two line question/ definition/ drawing small figures/ filling the blanks/ multiple choice question/ match the pairs etc)

- Minimum length of the submission is printed five A4 size pages.
- This is compulsory to record laboratory work in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.



**KSKV Kachchh University, Bhuj - Kachchh**  
**Zoology Syllabus as CBCS System**  
**Zoology Semester –III (PRACTICALS)**  
**CEZO 304 Ecology, Wildlife and Environmental issues**

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Study through charts and/or nearby ecosystem visit Practical 1 to 3

**Practical 1:** Study of wetland ecosystem

**Practical 2:** Study of Forest ecosystem

**Practical 3:** Study of Marine ecosystem

**Practical 4:** Plotting of important national Parks and Sanctuaries on map.

**Practical 5:** Study of wildlife tools: Binoculars, Tranquilizers (Guns and darts), Radio transmitters and receivers.

**Practical 6:** Study of collection and identification of common animals pugmarks.

**Practical 7:** Study of selected endangered animals (using IUCN or wildlife act categories) of India

**Practical 8:** Study of selected endangered animals of Gujarat (using IUCN or wildlife act categories)

**Practical 9:** Study of biostatistics-mean, median, mode. (with the practical examples and problem solving)

**Practical 10:** Basics of biostatics: Standard deviation (by problem solving).

*Study tour Report*

*Journal Submission*

**Instructions:**

- **The Zoological excursion is compulsory to study the ecosystem, Animal behavior and their life style for the students.**
- Excursion report is mandatory for all the students and marks will be calculated in practical examination
- This is compulsory to record laboratory work in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.



**KSKV Kachchh University, Bhuj - Kachchh**  
**(SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION)**  
**ZOOLOGY (304): Ecology, Wildlife and Environmental issues**

Date: \_\_\_\_\_

Total Marks: 30

Time: 4 hours

Q.1 Design/Draw/model the _____ ecosystem as asked.	05
Q.2 Plot the asked National Parks and Sanctuaries on the given map.	04
Q.3 Show the distribution of ( <u>endangered animals</u> ) on given map.	03
Q. 4. Solve the given biostatistics problem.	03
Q.3 Identify specimens 1 to 3 as per instructions:	06
1. Identify and do as directed -- wildlife tool	
2. Identify and write IUCN status of the animal	
3. Identify the pugmark of an animal	
Q.4. Viva voice	03
Q. 5 Report /submission	03
Q.5 Journal	03

