Anekant Education Society's

# TULJARAM CHATURCHAND COLLEGE

**OF ARTS, SCIENCE & COMMERCE, BARAMATI, DIST – PUNE.**

**AUTONOMOUS**


## UNDER GRADUATE DEPARTMENT OF ZOOLOGY

## SYLLABUS
## F. Y. B. Sc. Zoology Part-I,
## SEMESTER-I

## ACADEMIC YEAR 2022-2023

Anekant Education Society's

# TULJARAM CHATURCHAND COLLEGE

**OF ARTS, SCIENCE & COMMERCE, BARAMATI.**
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## Scheme of Course Structure (CBCS) Faculty of Science
## Department of Zoology

## SEMESTER-I

**Class: F.Y.B.Sc.** **Pattern: 40 (IA) + 60 (EA)**

| Semester | Paper Code | Title of Paper | No. of Credits |
|---|---|---|---|
| Semester I | USZL111 | Animal Systematics and Diversity - I | 2 |
| | USZL112 | Fundamentals of Cell Biology | 2 |
| | USZL113 | **Zoology Practical-I** | 2 |
| | | | |
| Semester II | USZL121 | Animal Systematics and Diversity - II | 2 |
| | USZL122 | Genetics | 2 |
| | USZL123 | **Zoology Practical-II** | 2 |

**IA* – Internal Assessment**
**EA* – External Assessment**

## SYLLABUS (CBCS) FOR F.Y.B.Sc. ZOOLOGY (w. e. f. June, 2022)

**Class: F.Y.B.Sc. (Semester - I)**
**Paper Code: USZL111**
**Paper: I** **Title of Paper: Animal Systematics and Diversity – I**
**Credit: 2** **No. of Lectures: 30**

**Learning Objectives:-**

- To emphasize on the basic characters and characteristics of the non-chordates.
- To emphasize on evolution and development of systems and animals.
- To emphasize on the habitat diversity of animals.
- To emphasize the importance of animals in ecosystem.
- To emphasize the importance of animal systematics.

**Learning Outcomes:-**

- Students will get the knowledge about Animals, their adaptations and associations in relation to their environment.
- Students understand the distinguishing characters and learn to identify the non-chordate animals.
- At the end of the course students will understand the classification system of invertebrate taxa, their evolution and associated morphological diversity and their role in ecosystem.
- Course will help to increase the awareness about importance of animals in ecosystem.
- Students will be able to categorize the animals as per their distinguishing characters.

**TOPICS / CONTENTS:**

| Unit | Subunit No | Content | Lectures |
|---|---|---|---|
| 1. Principles of animal classification | 1.1 | Introduction to invertebrates, Three Domain & Six kingdom classification system | 06 Lectures |
| | 1.2 | Importance of animal classification. | |
| | 1.3 | Systematics-Linnaean hierarchy (Phylum, Class, Order, Family, Genus and Species) | |
| | 1.4 | Taxonomy-Basic terminology and Introduction : Alpha, Beta and Gamma levels of taxonomy, Micro-taxonomy | |
| | 1.5 | Approaches to various taxonomic methods (Biochemical, molecular) | |
| 2. Classification with salient features (Up to class level with minimum one example of each class) | 2.1 | Protozoa | 06 Lectures |
| | 2.2 | Porifera | |
| | 2.3 | Coelenterata (Cnidaria) | |
| | 2.4 | Platyhelminthes | |
| | 2.5 | Aschelminthes | |
| | 2.6 | Annelida | |

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|---|---|---|---|
| **3. General topics** | 3.1 | Protozoa: Pathogenic protozoans (Any two) | **06 Lectures** |
| | 3.2 | Porifera: Skeleton | |
| | 3.3 | Cnidaria: Coral reefs & Its importance | |
| **4. Type study: *Pheretima posthuma*** | 4.1 | Systematic position, Habits and habitat | **12 Lectures** |
| | 4.2 | Morphology & Hydrostatic skeleton | |
| | 4.3 | Digestive system | |
| | 4.4 | Circulatory system | |
| | 4.5 | Excretory system. | |
| | 4.6 | Reproductive system | |
| | 4.7 | Nervous system and sense organs. | |
| | 4.8 | Regeneration | |
| | 4.9 | Economic importance | |

**REFERENCES:**


1. Textbook of Invertebrate Zoology, by Kotpal, RL. Rastogi and Co., Meerut.
2. Phylum Protozoa by Kotpal, RL., Rastogi and Co., Meerut.
3. Phylum Porifera by Kotpal, RL., Rastogi and Co. Meerut.
4. Phylum Coelenterata by Kotpal, RL., Rastogi and Co. Meerut.
5. Phylum Helminthes by Kotpal, RL., Rastogi and Co. Meerut.
6. Phylum Annelida by Kotpal, RL., Rastogi and Co. Meerut.
7. Phylum Platyhelminthes by Kotpal, RL., Rastogi and Co. Meerut.
8. Phylum Arthropoda by Kotpal, RL., Rastogi and Co. Meerut.
9. Phylum Mollusca by Kotpal, RL., Rastogi and Co. Meerut.
10. Phylum Echinodermata by Kotpal, RL., Rastogi and Co. Meerut.
11. Life of Vertebrates by Young, JZ., III Edition, Clarendon Press, London.
12. General Zoology by Goodnight and others IBH Publishing Co.
13. Invertebrate zoology By Jordan EL., and Verma PS., S. Chand and Co., NewDelhi.
14. Life of Invertebrates by Prasad,SN, Vikas Publishing House, New Delhi.
15. Zoology by S.A. Miller and J.P. Harley –Tata McGraw Hill Co.
16. Invertebrates, Richard Brusca, Sinauer Associates, Inc., Sunderland, USA.
17. Invertebrate Zoology by Dhami and Dhami.
18. Biology of the Invertebrates, Jan A. Pechenik, McGraw Hill Education.
19. Role of Earthworms in agriculture by Indian Council of Agricultural Research (ICAR) by Bhatt J.V.& Khambata S.R.


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## SYLLABUS (CBCS) FOR F.Y.B.Sc. ZOOLOGY (w. e. f. June, 2022)

**Class: F.Y.B.Sc. (Semester - I)**
**Paper Code: USZL112**
**Paper: II Title of Paper: FUNDAMENTALS OF CELL BIOLOGY**
**Credit: 2 No. of Lectures: 30**

**Learning Objectives:-**

- In this paper students will learn the basic structure of cell, its function and techniques to study the cytology.
- To develop awareness about the application and implementation of Cytological skills among the students. (to impart the cytological insights)
- Students will be conversant to types of cell division.
- Students will be updated about the importance of cell division.
- Students will be introduced to basic theoretical knowledge of some cytological techniques.

**Learning Outcomes:-**

- Students will become aware about types of cells.
- Students understand and distinguish subcellular structures and their functions.
- Students will understand the process of cell division.
- Students will understand the importance of cell division.
- Students will understand the cytological techniques.

**TOPICS / CONTENTS:**

| Unit | Subunit No | Content | Lectures |
|---|---|---|---|
| 01. Introduction to Cell Biology | 1.1 | Definition and brief history | (02 Lecture) |
| | 1.2 | Introduction to cell theory | |
| | 1.3 | Scope of Cell Biology | |
| 02. Study of Prokaryotic cell and Eukaryotic cell | 2.1 | Comparative study of Prokaryotic cell and Eukaryotic cell (Size, Shape, Volume, Number, Structure) | (01 Lecture) |
| | 2.2 | Comparative study of plant and animal cell | |
| 03. Structure and functions of cell membrane | 3.1 | Chemical composition | (04 Lecture) |
| | 3.2 | Fluid mosaic model | |
| | 3.3 | Functions of cell membrane | |
| 04. Cytoplasm | 4.1 | Physical Organization | (02 Lectures) |
| | 4.2 | Chemical Composition & Biological Properties | |
| 05. Study of cell organelles and their functions | 5.1 | Endoplasmic reticulum | (10 Lectures) |
| | 5.2 | Golgi complex | |
| | 5.3 | Lysosomes, Peroxisomes and Glyoxysomes | |
| | 5.4 | Ribosomes | |
| | 5.5 | Mitochondria | |
| | 5.6 | Chloroplast | |

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|---|---|---|---|
| **06. Nucleus** | 6.1 | Shape, size, number and position | **(03 Lectures)** |
| | 6.2 | Ultrastructure of nucleus | |
| | 6.3 | Functions of nucleus | |
| **07. Cell cycle** | 7.1 | Cell cycle in brief | **(06 Lectures)** |
| | 7.2 | Cell division:<br>1. Mitosis<br>2. Meiosis | |
| | 7.3 | Significance of cell division | |
| **08. Introduction to cytological techniques** | 8.1 | Introduction to Centrifugation & Density Gradient Centrifugation for Separation of Cell organelles | **(02 Lectures)** |

**REFERENCES:**


1. Cell Biology by Pawar CB, Himalaya Publication House.
2. Cell and Molecular Biology by Dupraw I, Academic Press, New York.
3. Cell Biology by avers, CJ. Addison Wesley Pub. Co. New York and London.
4. Cell and Molecular Biology by Carp, G., JohnWaley, USA.
5. Cell Biology by David, E., Sadava Johnes and Bartlett Publication, London.
6. Cell Structure and Function by Lowey, AG. and Siekevitz, JR., Menninger and Gallew, JAN., Saunder College Publication, Philadelphia.
7. The Cell by G.M. Cooper - Sinauer Associate Inc.
8. Cell Biology by Arumugamm Saras Publication.
9. Cytology, Genetics and Evolution by P.K. Gupta, Rastogi Publication.
10. Cell Biology by Kotpal.
11. Cell Biology by Swanson
12. Molecular Biology of the Cell, Text book by Bruce Alberts, Garland publishing, Inc. New York and London.
13. Cell and Molecular Biology by Lohar Prakash S. MJP Publishers, Chennai


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## SYLLABUS (CBCS) FOR F.Y.B.Sc. ZOOLOGY (w. e. f. June, 2022)

**Class: F.Y.B.Sc. (Semester - I)**
**Paper Code: USZL113**
**Paper: III** **Title of Paper: ZOOLOGY PRACTICAL-I**
**(Practicals Corresponding to USZL111, USZL112)**
**Credit: 2** **No. of Practicals: Any 10**

**Learning Objectives:-**

- In Students will learn invertebrate classification system.
- Students will learn culturing of animals (Some protozoa and vermicompost).
- Students will learn the vermiculture technique at domestic level.
- Students will learn to study various animal systems, cell organelles and cell division.
- Students will be trained in basic skills in animal dissection.

**Learning Outcomes:-**

- At the end of course students will acquires the skills to classify various invertebrate taxa.
- Students will competent to understand the subcellular structures.
- Students acquire the skills of slide preparation, identification of stages of cell division.
- Students acquire the skills in animal culturing, staining, handling and use of microscopes.
- Students acquire the skills in dissection of animals.

| Sr. No. | Title of Practical | Status |
|---|---|---|
| 1. | Title: Taxonomic classification upto class level<br>1. Phylum Protozoa<br>2. Phylum Porifera<br>3. Phylum Coelenterata | D |
| 2. | Title: Taxonomic classification upto class level<br>1. Phylum Platyhelminthes- *Taenia, Planaria.*<br>2. Phylum Aschelminthes- *Ascaris, Wuchereria bancrofti.* *(Filarial worm)*<br>3. Phylum Annelida- *Nereis, Leech.* | D |
| 3. | Culturing of animals (*Acathamoeba*/*Hydra*/*Paramoecium*) | E |
| 4. | Preparation of vermiculture laboratory unit (Activity based learning) | E |
| 5. | Dissection of earthworm so as to learn its digestive and nervous system | E/D |
| 6. | Make scientific drawings of 5 locally available invertebrate specimens belonging to different phyla | D/E |
| 7. | Microscopy: Study of Standard Operating Procedure of a Simple and Compound Microscope.(Activity based Learning) | E |
| 8. | Temporary preparation of a bacterial and protozoans on a slide and its observations under the microscope. | E |
| 9. | Ultrastructure study of:<br>a. Mitochondria<br>b. Nucleus<br>c. Endoplasmic Reticulum<br>d. Golgi complex<br>(WithPicture/Model/Chart) | D |
| 10. | Study of mitotic cell division using onion root tips | E |

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|---|---|---|
| 11. | Demonstration of mitochondria using Janus Green B stain OR Demonstration of Barr Body | E |
| 12. | Study Tour: Visit to established aquatic ecosystem / functional commercial vermicompost unit and submission of detailed tour report | |
| 13. | Museum Study: Platyhelminthes, Aschelminthes, Annelida, (one specimen of each | D |

**REFERENCES:**


1. Practical Zoology of Invertebrates by S. S. Lal.
2. Practical Zoology of Vertebrates by S. S. Lal.
3. Practical Zoology Vol-3 by N Arumugamm and A. Mani.
4. Practical Zoology of Invertebrates by Jordan and Verma.
5. Practical Zoology of Vertebrates by Jordan and Verma.
6. Practical Zoology of Cell Biology by S. S. Lal.
7. *i* Genetics- Molecular Approach, 3rd Ed. by Peter J. Russell, Pearson.