Anekant Education Society's

TULJARAM CHATURCHAND COLLEGE

OF ARTS, SCIENCE & COMMERCE, BARAMATI.

(AUTONOMOUS INSTITUTE)

SYLLABUS

FIRST YEAR B.Sc. ZOOLOGY

ACADEMIC YEAR 2022-2023

SEMESTER - II

Anekant Education Society's

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OF ARTS, SCIENCE & COMMERCE, BARAMATI.

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Scheme of Course Structure (CBCS)

Faculty of Science

Department: Zoology

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

Semester	Paper Code	Title of Paper	No. of Credits
Semester II	USZL121	Animal Diversity - II	**2**
	USZL122	Genetics	**2**
	USZL123	Animal Diversity –II and Genetics Lab	**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 - II)
Paper Code: USZL: 121
Paper: I Title of Paper: Animal Diversity – II
Credit: 2 No. of Lectures: 30

Learning Objectives:-

- Basic classification and characteristics of chordates.
- Evolution and development of animals.
- Conservation and sustainable use of biodiversity.
- Animal interactions with their environment.

Learning Outcomes:-

- Conceptual knowledge of animals, their adaptations and associations to environment.
- Taxonomic identification systems in animal classification (Phylum Chordata) .
- Biodiversity and animal conservation.

TOPICS:

Unit No.	Subunit No	Details
1. General characters and classification up to order level with oneexample from following: (6L)	1.1	Hemichordata
	1.2	Urochordata
	1.3	Cephalochordata
2. General characters up to order level with one example from following: (6L)	2.1	Cyclostomata
	2.2	Pisces - (Chondrichthyes and Osteichthyes)
	2.3	Amphibia
3. General topics: (14L)	3.1	Hemichordata: Affinities
	3.2	Retrogressive metamorphosis in Urochordata
	3.3	Pisces: Migration
	3.4	Neoteny in Amphibia
4. Type study of animal: Frog (4L)	4.1	General classification, habit and habitat
	4.2	External characters and sexual dimorphism
	4.3	Sense organs (Eye, ear and skin)
	4.4	Digestive system (Food, feeding and physiology of digestion)
	4.5	Circulatory system (Lymphatic system not expected)
	4.6	Central nervous system (Brain and spinal cord)
	4.7	Reproductive systems (Male & female)

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

Class: F.Y.B.Sc. (Semester - II)
Paper Code: USZL: 122
Paper: II **Title of Paper: Genetics**
Credit: 2 **No. of Lectures: 30**

Learning Objectives:-

- Introduction to the basic Mendelian & non Mendelian Genetics.
- To understand and learn the fundamentals of genetics and its applications

Learning Outcomes:-

- Understanding of the basic Mendelian & non-Mendelian Genetics.
- Knowledge of human genetic disorders and syndrome.
- Understanding importance of Genetics & its applications for human welfare.
- Problem solving abilities in genetics.

TOPICS:

Unit No.	Subunit No.	Details
1. Introduction to genetics (3 L)	1.1	Basic concepts in genetics
	1.2	Mendelian Laws of Inheritance and their practical applications
	1.3	Test of heredity
2. Multiple Alleles and Polygenic Inheritance (5 L)	2.1	Concept, characteristics and importance of multiple alleles, ABO & Rh-blood group system and its medico-legal importance
	2.2	Pleiotropism and sickle cell anaemia.
3. Gene Interaction (4 L)	3.1	Concept of gene interaction, co-dominance and incomplete dominance
	3.2	Complementary factors (9:7)
	3.3	Supplementary factors (9:3:4)
	3.4	Inhibitory factors (13:3)
4. Chromosomes (5 L)	4.1	Introduction to morphology and composition
	4.2	Classification based on the centromeric position
	4.3	Types of chromosomes (autosomes and sex chromosomes) Special type of chromosomes: Polytene chromosome - salivary gland chromosome in *Drosophila*, Lampbrush chromosome in amphibian oocyte
	4.4	Chromosomal aberrations: Structural and numerical changes

5. Sex-determination (4 L)	5.1	Introduction
	5.2	Chromosomal theory of sex determination (XX-XY, ZZ-ZW, XX-XO & Haploid- Diploid method)
	5.3	Parthenogenesis and Gynandromorphism
	5.4	Environmental sex determination
6. *Drosophila* as Genetic model organism (2 L)	6.1	Morphology, sexual dimorphism and life cycle
	6.2	Mutants: eye, wings and body colour (Two mutants of each type)
7. Human genetics (5 L)	7.1	Study of human karyotype
	7.2	Syndromes: a) Autosomal-Down's (Mongolism) b) Sex chromosomal abnormalities in human: Klinefelter's and Turner's syndrome
	7.3	Inborn errors of metabolism: Albinism and Phenylketonuria
	7.4	Genetic counselling and its importance
8. Sex linked inheritance in human (2 L)	8.1	Inheritance of colour blindness, Haemophilia and Hypertrichosis

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

Class: F.Y.B.Sc. (Semester - II)
Paper Code: USZL: 123
Paper: III Paper title: Zoology Practical-II: Animal Diversity –II and Genetics Lab
Credit: 2 No. of Practicals: Any 10

Learning Objectives:-

- Vertebrate classification system.
- Morphometric analysis & different types of tail fins of the fishes.
- Culturing of *Drosophila*
- Human genetic traits & human karyotype ABO blood group system
- Basic skills in animal dissection.

Learning Outcomes:-

- Skills to classify various invertebrate taxa.
- Human genetic traits, karyotype & ABO blood group system.
- Slide preparation different scales of fishes.
- *Drosophila* culturing.
- Skills in dissection of animals.

Practicals:

Practical No.	Name of the practical	E/D
1	To study the classification with reasons of the following: I. Hemichordata- *Balanoglossus* II. Urochordata- *Hardmania* III. Cephalochordata- *Amphioxus* IV. Cartilaginous fish- *Scoliodon* V. Bony fish- Sea horse	D
2	Study of fish scales and chromatophores.	E
3	Morphometric study of any freshwater fish: Measurements of body length, standard length, weigh and length-weight relationship.	E
4	Study and demonstration of morphological and anatomical structures of preserved frog specimen a) Study of external characters, sexual dimorphism. b) Digestive system and brain of frog.	D
5	Collection of any five animals, their photographic images, their morphological characters and identification from practical 01. **(Activity based learning)**	-
6	Study of human genetic disorders (any two) hereditary disorders / inborn errors of metabolism.	D
7	Profile of Any two Geneticists (**Activity based learning**).	-
8	Study of human blood groups: ABO and Rh- factor.	E

9	Genetical Problems: Based on Monohybrid, Dihybrid Cross & ABO Blood Groups.	E
10	Study of Karyotype: Study of normal human karyotype and one abnormal karyotype (any one of Down' s Klinefelter's or turner's from metaphase chromosomal spread picture (image based learning).	E
11	Study of human genetical traits: Tongue rolling, widow's peak, ear lobes, colour blindness and PTC tasters/ non tasters (video based practical).	D
12	Study of *Drosophila*: A) Culture of *Drosophila* B) External Characters, Sexual Dimorphism and life cycle. C) Mutants: Eye and wing mutants (any two of each).	D
13	A visit to natural habitat for biodiversity study or Study visit to a research institute or a zoo and submission of report is essential.	-