Deccan Education Society's

FERGUSSON COLLEGE, PUNE
(AUTONOMOUS)

SYLLABUS
FIRST YEAR B.Sc. ZOOLOGY

Academic Year 2016-2017

SEMESTER - I

Deccan Education Society's
FERGUSSON COLLEGE, PUNE
Scheme of Course Structure (Faculty of Science)
Department: Zoology

Semester	Paper Code	Title of Paper	No. of Credits
Semester I	ZOO1101	Life and Diversity of Animals - I	2
	ZOO1102	Cell Biology	2
	ZOO1103	Zoology Practical - I	2
Semester II	ZOO1201	Life and Diversity of Animals - II	2
	ZOO1202	Principles of Genetics	2
	ZOO1203	Zoology Practical - II	2

PAPER CODE: ZOO1101 (Semester 1)

PAPER - I: Life and Diversity of Animals - I

PAPER CODE: ZOO1201 (Semester 2)

PAPER - I: Life and Diversity of Animals - II

Learning objectives:

- To learn basic classification and characteristics of invertebrates.
- To learn about evolution and development of system and animals.
- To make the students aware about conservation and sustainable use of biodiversity.
- To emphasise on the habitat diversity of animals.

PAPER CODE: ZOO1102 (Semester 1)

PAPER - II: CELL BIOLOGY

PAPER CODE: ZOO1202 (Semester 2)

PAPER - II: PRINCIPLES OF GENETICS

Learning objectives:

- To introduce the basic cell science and related activities among the students.
- To develop awareness about the application and implementation of cytological skills among the students.
- To understand and learn the fundamentals of genetics and its application for the benefit of human being.

PAPER CODE: ZOO1101
PAPER - I: Life and Diversity of Animals - I

[Credit -2: No. of Lectures 36]

	Title and Contents	No. of Lectures
Unit - I	**Principles of classification:** 1.1 Definition 1.2 Origin and development of systematics 1.3 Systematics-Linnaean hierarchy (Phylum, Class, Order, Family,Genus and Species) 1.4 Binomial nomenclature 1.5 Five kingdom classification system	**4**
Unit - II	**Outline of classification with salient features of the following phyla:** (upto class with one example 2.1 Protozoa 2.2 Porifera 2.3 Coelenterata (Cnidaria) 2.4 Platyhelminthes 2.5 Aschelminthes 2.6 Annelida 2.7 Arthropoda 2.8 Mollusca 2.9 Echinodermata	**13**
Unit - III	**General topics:** 3.1 Parasitism in Protozoa.	**3**
Unit - IV	**Study of Earthworm:** 4.1 Systematic position, Habits and habitat 4.2 External characters 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 Economic importance.	**16**

References:

1 Life of Vertebrates By Young, JZ., III Edition, Clarendon Press, London.

2 General Zoology By Goodnight and others IBH Publishing Co.

3 Invertebrate zoology By Jordan EL., andVerma PS., S. Chand and Co., New Delhi.

4 Textbook of Invertebrate Zoology, By Kotpal, RL., Rastogi and Co., Meerut.

5 Phylum Protozoa By Kotpal, RL., Rastogi and Co., Meerut.

6 Phylum Porifera By Kotpal, RL., Rastogi and Co. Meerut.

7 Phylum Coelentrates By Kotpal, RL., Rastogi and Co. Meerut.

8 Phylum Helminthes By Kotpal, RL., Rastogi and Co. Meerut.

9 Phylum Annelida By Kotpal, RL., Rastogi and Co. Meerut.

10 Life of Invertebrates By Prasad, ASN, Vikas Publishing House, New Delhi.

11 Zoology by S.A. Miller and J.P. Harley - The McGraw Hill Co.

PAPER CODE:ZOO1102
PAPER - II: CELL BIOLOGY
[Credit -2: No. of Lectures 36]

	Title and Contents	No. of Lectures
Unit - I	**Introduction to cell biology:** 1.1 Definition, introduction to cell theory.	**02**
Unit - II	**Structure of prokaryotic (*E.coli*) and eukaryotic (Plant and Animal) cell**	**02**
Unit - III	**Structure and function of cell membrane:** 3.1 Chemical composition 3.2 Fluid mosaic model 3.3 Functions of plasma membrane	**06**
Unit - IV	**Cytoplasm** 4.1 Chemical composition and Biological properties	**02**
Unit - V	**Study of following cell organelles with respect to structure and functions in brief:** 5.1 Endoplasmic reticulum 5.2 Golgi complex 5.3 Lysosomes, peroxisomes and glyoxysomes 5.4 Ribosomes 5.5 Mitochondria	**12**
Unit - VI	**Nucleus:** 6.1 Shape, size, number and position 6.2 Ultra structure of nucleus 6.3 Functions of nucleus	**03**

Unit - VII	**Cell division and its significance:** 7.1 Cell cycle in brief 7.2 Mitosis 7.3 Meiosis	**05**
Unit - VIII	**General Topics** 8.1 Cell - cell signalling 8.2 Apoptosis and its significance	**04**

References:

1. Cell Biology By Powar CB, Himalaya Publication House25.
2. Cell and Molecular Biology By Dupraw I, Academic Press, New York 26.
3. Cell Biology By avers, CJ., Addison Wesley Pub. Co. New York and London 27.
4. Cell and Molecular Biology By Carp,G., JohnWaley, USA 28.
5. Cell Biology By David, E., Sadava Johnes and Bartlett Publication, London 29.
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.

	PAPER CODE: ZOO1103 **PAPER - III: Zoology Practical - I** **[Credit - 2: No. of Practicals 10]** ***D=Demonstration, E=Experiment.**
	Title of Experiment/ Practical
1	To study the classification with characters of the following (D) Phylum Protozoa- *Paramecium* Phylum Porifera- *Sycon* Phylum Coelenterata (Cnidaria) - *Hydra* Phylum Platyhelminthes- *Taenia*
2	To study the classification with reasons of the following (D) Phylum Aschelminthes- *Ascaris* Phylum Annelida- *Nereis* Phylum Arthropoda – *Cancer* (Crab) Phylum Mollusca- *Octopus* Phylum Echinodermata- *Echinus*
3	Study of protozoan parasites - (any five) (D) *Balantidium, Entamoeba, Monocytis, Plasmodium, Trypanosoma, Giardia, Trichomonas*
4	Temporary preparation of spicules from any one sponge. (E)
5	Study of prokaryotic and eukaryotic cell with the help of picture/model/chart. (D)
6	Study of Cell organelles (Mitochondria, Endoplasmic reticulum, Golgi complex)with the help of picture/model/chart (D)
7	Study of different mitotic stages with the help of permanent slides. (D)
8	Detection of mitochondria from onion peeling by Janus Green staining. (E)
9	Identification and classification of any five animals from Fergusson College campus to create an awareness about the conservation of animals. (Activity based learning)
10	Standard operating procedures of a compound microscope (Activity based learning)

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SEMESTER - II

PAPER CODE: ZOO1201
PAPER - I: Life and Diversity of Animals - II
[Credit - 2: No. of Lectures 36]

	Title and Contents	No. of Lectures
Unit - I	**General characters of Chordates and classification of chordates upto class.**	**03**
Unit - II	**General characters and classification of following subphyla upto class with one example**. 2.1Hemichordata: 2.2 Urochordata 2.2Cephalochordata	**06**
Unit - III	**Salient features and classification upto order with one example of the following:** 3.1 Pisces- (Chondrichthyes and Osteichthyes fishes) 3.2Amphibia.	**04**
Unit - IV	**Study of Frog:** 4.1 Systematic position, Habit and habitat 4.2 External characters and sexual dimorphism 4.3 Digestive system, food, feeding and physiology of digestion 4.4 Circulatory system (lymphatic system not expected) 4.5 Central Nervous system 4.6 Sense organs 4.7 Reproductive systems (male & female)	**19**
Unit - V	**General topics:** 5.1 Study of Lung fishes 5.2 Study of different types of scales in fishes.	**04**

References:

1. The Frog-its reproduction and development -By Robert Rugh,Tata McGraw Hill Edition, New Delhi.
2. Biology of Animals By Ganguly, BB., Sinha, A.K., Adhikari, S., New Central Book Agency, Kolkata.
3. Introduction to Amphibia By Bhamrah, MS., Juneja, K., Anmol Publication, Delhi.
4. Life of Vertebrates By Young, JZ., III Edition, Clarendon Press, London.
5. General Zoology By Goodnight and others IBH Publishing Co.
6. Life of Vertebrates By Young, JZ., III Edition, Clarendon Press, London.
7. General Zoology By Goodnight and others IBH Publishing Co.
8. Textbook of Vertebrate Zoology, By Kotpal, RL., Rastogi and Co.

Meerut
9. Animal Diversity By Kershaw, DR., Redwood Burn Ltd., Trowbridge
10. Textbook of Zoology By Parkar J. and Haswell, W., ELBS Edition
11. Textbook of Zoology By Vidyarthi, Agrasia Publishers, Agra.
12. Chordate zoology By Jorden EL., and Verma PS., S. Chand and Co., New Delhi.
13. Functional Organization of chordates (part I and II) By Nigam HC. And Sobti, R., S.Chand and Co., New Delhi.

PAPER CODE:ZOO1202
PAPER - II: PRINCIPLES OF GENETICS
[Credit -2: No. of Lectures 36]

	Title and Contents	No. of Lectures
Unit - I	**Introduction to genetics:** 1.1 Mendelian inheritance: laws of heredity and their practical application 1.2 Test cross and Back cross	**04**
Unit - II	**Gene Interaction:** 2.1Concept of gene interaction, co-dominance and incomplete dominance 2.2 Complementary factor (9:7) 2.3 Supplementary Factor (9: 3:4) 2.4 Inhibitory factor (13:3) 2.5 Duplicate dominant factor (15:1)	**06**
Unit - III	**Lethal genes in *Mus musculus* (Mice)**	**02**
Unit - IV	**Multiple Alleles:** 4.1 Concept, characteristics and importance of multiples alleles, ABO & Rh-blood group system and its medico legal importance. 4.2 Concept of polygenic inheritance with reference to skin colour in human being	**04**
Unit - V	**Chromosomes:** 5.1 Introduction to morphology and composition 5.2 Classification based on the centromeric position 5.3 Types of chromosomes (autosomes and sex chromosomes) 5.2 Chromosomal aberrations: structural changes	**06**
Unit - VI	**Study of Drosophila:** 6.1 Morphology and sexual dimorphism 6.2 Life cycle 6.3 Mutants: eye, wings and body colour (Two mutants of each type)	**04**
Unit - VII	**Human genetics:** 7.1 Study of human karyotype 7.2 Syndromes: a) Autosomal-Down's (Mongolism), Patau's, Edward's and Cri-du-chat b) Sex chromosomal abnormalities in human	**06**

	being: Klinefelter's and Turner's syndrome 7.3 Inborn errors of metabolism: albinism, phenylketonuria and alkaptonuria	
Unit - VIII	**Sex linked inheritance in human:** 8.1 Inheritance of Colour-blindness, haemophilia and hypertrichosis	**04**

	PAPER CODE: ZOO1203 **PAPER –III: Zoology Practical - II** **[Credit -2: No. of Practicals 10]**
	Title of Experiment/ Practical
1	To study the classification with characters of the following Hemichordata- *Balanoglossus* Urochordata- *Doliolum* Cephalochordata- *Amphioxus* Cartilaginous fishes- *Scoliodon* Bony fishes- *Labeo* (D)
2	Study of external characters, sexual dimorphism and digestive system of Frog with the help of model/ charts (D)
3	Study of brain of Frog with the help of model/ chart (D)
4	Temporary preparation of placoid and cycloid scales from preserved fishes. (E)
5	Study of *Drosophila*: External characters, sexual dimorphism and mutants (any two eye and any two wing mutants) (D)
6	Study of genetic traits in human beings (tongue rolling, widow's peak, ear lobes, colour blindness and PTC tasters/ non tasters) (E)
7	Study of normal human karyotype from metaphase chromosomal spread picture (E)
8	Study of human blood groups (ABO and Rh- factor) (E)
9	Description and classification of any five animals from Zoology Museum of Fergusson College (Activity based learning)
10	Study of any two genetic disorders from human population (Activity based learning)