RAJARSHI SHAHU MAHAVIDYALAYA, LATUR.
Semester wise course structure
B.Sc. F.Y. Semester –I
Sub: Zoology
W.e.f. the Academic Year 2014-2015 (Revised)
PAPER-I Course code- 154
GENERAL ZOOLOGY

Learning Objective:

- Students will the able to identify and define a invertebrates and Vertebrates.
- Students will the able classify animals as an invertebrate and Vertebrate.
- Students will be able to compare different classes of invertebrates and Vertebrates.

Course Outcomes:

- Learner can differentiate the invertebrates and Vertebrates.
- Learner can classify an invertebrates and Vertebrates.
- Learner can compare invertebrates with Vertebrates with different basic characters.

Unit – I(General characters and Classification up to class level of each phylum)

i) Phylum Protozoa-life cycle of plasmodium

ii) Phylum Porifera

iii) Phylum Coelenterate and Helminthes

iv) Phylum Annelida-Type study of leech

Unit –II (General characters and Classification up to class level of each phylum)

i) Phylum Arthropoda

ii) Phylum Mollusca and Echinodermata

iii) Protochordata:-

a) Subphylum Hemichordata

b) Subphylum Urochordata, Retrogressive metamorphosis

c) Subphylum Cephalochordates.

UNIT:-III Vertebrates- (General characters and classification with suitable example)

i) Basic charecterstistics of chordates.

ii) Agnatha-Cyclostomata

iii) Pisces

iv) Dipnoi

v) Amphibian and Reptelia-Identification of Poisonous and Non- Poisonous Snakes

vi) Aves and Mammalia-Prototheria, Metatheria and Eutheria

UNIT:-1V Type study: Rat

i) Morphology

ii) Digestive system

iii) Respiratory system

iv) Circulatory, Brain and Reproductive system

v) Sense organs: - Ear and Eye.

Suggested Readings

1. Invertebrate Zoology by Jordan E.L. and P.S.Verma S.Chand Publication, and Co., Ltd. Ram Nager New Delhi
2. Vertebrate Zoology by Jordan E.L. and P.S.Verma S.Chand Publication, and Co., Ltd. Ram Nager New Delhi
3. Non-Chordate Zoology by Dhabi and Dhami Pradeep Publication, Opposite Sitla Mandir, Jalndhar-144008
4. Chordate Zoology by Dhami and Dhami- Pradeep Publication, Opposite Sitla Mandir, Jalndhar-144008
5. A Text book of Embryology By. Arumugam Saras Publication
6. Rat A mammalian type By G.R. Kshirsagar., G.Y.-Rane Prakashan ,Tilak Road ,Poona 30.

RAJARSHI SHAHU MAHAVIDYALAYA, LATUR.
Semester wise course structure
B.Sc. F.Y. Semester –I
Sub : Zoology
W.e.f. the Academic Year - 2014-2015 (Revised)
PAPER-II Course code-
CELL BIOLOGY AND BIO INSTRUMENTATION

Learning Objective:

- To study the structural and functional organization of cell
- To make the students understand the structure and functions of cell organelles
- To understand the importance of nucleus in the cell
- To understand the role of various physical and chemical components of the cell
- To learn basic techniques in cytology
- To study various bioinstrumentation

Course Outcomes:

- Learner would acquire insight of transport mechanisms for maintenance and composition of cell
- Learner would able to find out chemical composition of cell and its organelles.
- Learner would acquire skill of different instruments for research analysis.

Unit – I

i) Introduction to Cell Biology

ii) Cell and Cell Theory

iii) Ultra structure of prokaryotic and eukaryotic cell

iv) Comparison between plant and animal cell

v) Structure and Function of plasma membrane

Unit –II

i) Structure and Function of Endoplasmic reticulum

ii) Structure and Function of Golgi complex

iii) Structure and Function of Mitochondria

iv) Structure and Function of Ribosome

v) Structure and Function of Lysosome

Unit:-III

i) Structure and function of Nucleus and Chromosome

ii) Cell cycle-Its regulation and Significance,

iii) Mitosis, Meiosis and their significance. v) Apoptosis

iv) Cell Fractionation and Centrifugation

v) Autoradiography

Unit:-IV

i) Chromatography: - Paper, Thin layer, Column Chromatography

ii) Electrophoresis-Principles and Working

iii) Colorimeter- Principles and Working

iv) PH meter- Principles and Working

v) Micro-Technique and Microscopy

Suggested Readings

1. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology by

P.S.Verma and V. K. Agarwal S.Chand Publication, and Co., Ltd. Ram nager New Delhi

2. Cell (A Molecular approach): Cooper, G. M.

3. Cell and Molecular Biology (1996) Karp, G.

4. Cell Biology (1993) Sativa D. E.

5. Cell and Molecular Biology (1995) Kish V. M. and Klein smith L. J.

6. Cell and Molecular Biology: De Roberts and Roberts

7. Cell Biology by C.B. Pawar

8. Elements of Biotechnology by P.K. Gupta and Rastogi

RAJARSHI SHAHU MAHAVIDYALAYA, LATUR.
Semester wise course structure
B.Sc. F.Y. Semester –I
Sub: Zoology
W.e.f. the Academic Year -2014-2015 (Revised)
Lab course: I Course code-
GENERAL ZOOLOGY, CELL BIOLOGY AND BIO INSTRUMENTATION

GENERAL ZOOLOGY

1) Museum Study-I

Study of at least two museum specimens from invertebrate phyla (protozoa to Echinodermata and Protochordata

2) Museum Study-II

Study of at least two museum specimens from Cyclostomatous to Mammalia

3) Mountings:

Spicules and gemmules of sycon, Obeliacolony, Jaws of leech &Nephridia, Nereis Parapodia

Scales: Ctenoid, Cycloid and Placoid

4) Staining

Identification of microorganism and Plankton from water sample by single staining technique.

CELL BIOLOGY AND BIO INSTRUMENTATION

1. To demonstrate the presence of mitochondria in striated muscle cells and epithelial cell using Vital stain Janus Green B.
2. Squash preparations to observe stages of Mitosis and Meiosis in onion root tips, and bud anthers

Temporary /Grasshopper testis respectively

3. Study of mitosis and meiosis from permanent slides.
4. Identification and study of cells- Slides/Photomicrographs/live cell

(Amoeba, Sperm, Euglena, Bacteria).

5. Identification and study of Skeletal, smooth and cardiac muscles by staining method.
6. Study of blood cells by staining smear
8. Separation of lipid/amino acid by paper chromatography.
9. Colorimetric estimation of glucose/protein.
10. Excursion report

NOTE: Any twelve practicals for each semester

RAJARSHI SHAHU MAHAVIDYALAYA, LATUR.
Semester wise course structure
B.Sc. F.Y. Semester –II
Sub : Zoology
W.e.f. the Academic Year 2014-2015 (Revised)

PAPER-III
DEVELOPMENTAL BIOLOGY

Learning objective

- To acquaint the learner with key concepts of embryology.
- To study causes of infertility.
- To study importance of stem cell.

Course Outcomes:

- Learner will be able to understand and compare the different pre- embryonic stages
- Learner will be able to appreciate the functional aspects of extra embryonic membranes and classify the different types of placenta.
- Learner will be able to understand causes of infertility and importance of stem cells

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Unit –I Introduction

i) Gametogenesis- Spermatogenesis and Oogenesis,

ii) Types of eggs,

iii) Male and Female gametes

IV) General fertilization

Unit –II Early Embryonic Development of frog

i) Cleavage

ii) Blastulation and Gastrulation

iii) Differentiation of germ layers

iv) Metamorphosis- changes and hormonal regulation of metamorphosis in amphibians

Unit –III

i) Extra embryonic membranes in Chick

ii) Placenta in mammals- structure, types and physiology of placenta

iii) Regeneration in animals-(invertebrates and Vertebrates)

vi) Developmental study of *Drosophila melanogaster*/ Zebra fish

Unit-IV

i) Infertility, Diagnosing Infertility-Test tube baby and Gamete intra fallopian transfer.

ii) Ageing concept

iii) Stem cell- Embryonic stem cell, Adult stem cell, Haemopoetic stem cell,

Nervous stem cell,

Suggested Readings

1. A Text book of Embryology By. Arumugam Saras Publication

2. Elements of Biotechnology by P.K. Gupta and Rastogi

3. Developmental Biology: - Scott F. Gilbert

4. Balinsky: Introduction to embryology (CBS College Publisher)

5. Berril, N.J. Developmental Biology (Tata-McGraw Hill)

RAJARSHI SHAHU MAHAVIDYALAYA, LATUR.
Semester wise course structure
B.Sc. F.Y. Semester –II
Sub: Zoology
W.e.f. the Academic Year 2014-2015 (Revised)
PAPER-IV
HISTOLOGY AND HISTOCHEMISTRY

Learning objective

- To acquaint the learner with key concepts of Histology and Histochemistry.
- To study structural aspect of different organs.
- To study various histochemical techniques used in analysis of biochemical's.

Course Outcomes:

- Learner will be able to understand and compare the different key concepts of Histology and Histochemistry
- Learner will be able to understand structural aspect of different organs
- Learner will be able use various histochemical techniques for analysis of different biochemical's like Proteins, carbohydrates, Lipids. and Nucleic acid.

Unit –I (Tissues)

1) Epithelial tissue: a) Squamous b) Cuboidal c) Columnard) Glandular

2) Connective tissue: a) Hyaline cartilage b) Bone,

3) Loose connective tissues: Blood and lymph

Unit –II (Histology of organs)

i) Stomach ii) Intestine iii) Liver iv) Kidney v) Pancreas

Unit –III Histology of endocrine gland

i) Pituitary gland ii) Thyroid gland iii) Adrenal gland iv) Testis and Ovary

Unit-IV(Histochemical Technique for Proteins, Carbohydrates and Lipids)

i) Protein:-Ninhydrin Schiff Method (Amino groups)

ii) Carbohydrates- PAS reaction (Bauer-Feulgen method -Glycogen)

iii) Lipids – Oil Red O Method, Sudan black B method.

iv) Histochemical Technique for Nucleic Acid- DNA – Feulgen Nuclear Method,

Suggested Readings

1. Patki, L.R. et al., 1983.An introduction to Micro technique. S. Chand
2. Bruce Cassel man, W.G. (1962) histochemical technique. Buffer and Tanners
3. Bancroft, J.D., Alan Stevens and Turner, D.R. 1996. Theory and Practice of Histological Techniques. Churchill Livingstone, New York
4. Histology Mammals: Athavale, M.V. and Latey, A.N.
5. 4.Histology Greep: R.O. and Well,L.

RAJARSHI SHAHU MAHAVIDYALAYA, LATUR.
Semester wise course structure
B.Sc. F.Y. Semester –II
Sub: Zoology
W.e.f. the Academic **Year 2014-2015 (Revised)**
Lab course: II
DEVELOPMENTAL BIOLOGY, HISTOLOGY, HISTOCHEMISTRY AND DEVELOPMENTAL BIOLOGY

Learning Objectives

- To make the students to understand the life history of frog.
- To make the students to understand the developmental study of chick.
- To make the students to understand the different tissues and stem cells.
- To make the students to understand the Microtomy techniques.

Course Outcome

- Learners would understand the life history of frog.
- Learners would be able to identify permanent slides of chick embryo.
- Learners would be able to understand process of cell division by Squash preparation.
- Learners would able to prepared permanent slides of different tissues.

Practicals:

DEVELOPMENTAL BIOLOGY

1. Study of eggs and tadpole of frog from collected/Preserved material
2. Study of frog development through permanent slides and models/Chart.
3. Whole mount preparations of chick embryos
4. Temporary preparations of blastoderm of chick
5. Study of types of eggs.
6. Sperms smear preparation
7. Study of regeneration in invertebrates and vertebrates
8. Study of parthenogenesis in Honey bee
9. Study of permanent slides of Chick Embryo: 18 hrs. 24 hrs. 36 hrs. 48 hrs., 72 hrs. Stages.
10. Identification and study of male and female gametes of frog.

HISTOLOGY AND HISTOCHEMISTRY

1. Temporary preparation of Squamous epithelium, ciliated epithelium, skeletal Muscle fiber and blood smear.
2. Study of histological structure of following organs – Stomach, intestine, pancreas, liver, Kidney, testis, ovary, thyroid, adrenal and pituitary.
3. Preparation of histological permanent slides by the process of block Preparation, section cutting and staining.
4. Location of biomolecules like, protein, carbohydrates, lipids by Histochemistry techniques

NOTE: Any twelve practicals for each semester

Rajarshi Shahu Mahavidyalaya,(Autonomous)
Latur.

Syllabus
B.Sc. First Year
ZOOLOGY
(Revised)

(First and Second Semester)
Semester Pattern
W.e.f. 2014-15

RAJARSHI SHAHU MAHAVIDYALAYA, LATUR.
Semester wise course structure
.B.Sc. F.Y. Zoology w.e.f. the Academic Year 2014-2015
SUBJECT: ZOOLOGY
SYLLABUS (REVISED)

Sr.No.	Semesters	Course Title	Papers No.	Marks	Periods
1.	I	General Zoology	I	50	45
		Cell Biology and Bioinstrumentation	II	50	45
		Lab.Course	III	50	
2.	II	Developmental Biology	IV	50	45
		Histology and Histochemistry	V	50	45
		Lab.Course	VI	50	45