MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL.

# B.Sc., MAJOR ZOOLOGY

CBCS – SYLLABUS 2015-2016 onwards

**MOTHER TERESA WOMEN'S UNIVERSITY**
**KODAIKANAL.**
**B. Sc. ZOOLOGY**

## Course Structure for the Major Zoology under CBCS: 2015-16onwards

| Paper No. | Paper Code | Course Title | Credits | Continuous Internal Assessment (CIS) | End Semester Exam (ESE) | Total |
|---|---|---|---|---|---|---|
| **I-SEMESTER** | | | | | | |
| 1. | B1TA1 | Part I - Tamil | 3 | 40 | 60 | 100 |
| 2. | B2EN1 | Part II - English | 3 | 40 | 60 | 100 |
| 3. | BZOC1 | Part III – **Major-** Invertebrata I | 4 | 40 | 60 | 100 |
| 4. | BZOC2 | **Major**- Invertebrata II | 4 | 40 | 60 | 100 |
| 5. | BABO1 | **Allied**- Botany paper-I | 4 | 40 | 60 | 100 |
| 6. | ONMVE | Value Education | 3 | 40 | 60 | 100 |
| | | TOTAL | 21 | | | 600 |
| **II –SEMESTER** | | | | | | |
| 7. | B1TA2 | Part I – Tamil | 3 | 40 | 60 | 100 |
| 8. | B2EN2 | Part II - English | 3 | 40 | 60 | 100 |
| 9. | BZOC3 | Part III - **Major** Chordata | 4 | 40 | 60 | 100 |
| 10. | BZOP1 | **Major Practical I** Invertebrata & Chordata | 4 | 40 | 60 | 100 |
| 11. | BABO2 | **Allied** - Botany Practical I | 4 | 40 | 60 | 100 |
| 12. | ONMES | Environmental studies | 2 | 40 | 60 | 100 |
| | | TOTAL | 20 | | | 600 |
| **SEMESTER – III** | | | | | | |
| 13. | B1TA3 | Part I – Tamil | 3 | 40 | 60 | 100 |
| 14. | B2EN3 | Part II – English | 3 | 40 | 60 | 100 |
| 15. | BZOC4 | Part III – Major Developmental Biology | 4 | 40 | 60 | 100 |
| 16. | BACH1 | **Allied** Chemistry Paper-I | 4 | 40 | 60 | 100 |
| 17. | BZOE1 | **Elective paper- I** Immunology | 3 | 40 | 60 | 100 |
| 18. | **SBSVC** | SBS-Vermiculture | 2 | 40 | 60 | 100 |
| 19. | **ONMAC** | NME- Apiculture | 2 | 40 | 60 | 100 |
| | | TOTAL | 21 | | | 700 |

## SEMESTER - IV

| | | | | | | |
|---|---|---|---|---|---|---|
| 20. | B1TA4 | Part I – Tamil | 3 | 40 | 60 | 100 |
| 21. | B2EN4 | Part II – English | | 40 | 60 | 100 |
| 22. | BZOC5 | Part III – Major – Microbiology | 4 | 40 | 60 | 100 |
| 23. | BZOP2 | **Major - Practical – II** | 4 | 40 | 60 | 100 |
| 24. | BACH2 | Allied – Chemistry Practical- I | 4 | 40 | 60 | 100 |
| 25. | BZOE2 | **Elective Paper-II** Sericulture | 3 | 40 | 60 | 100 |
| 26. | **SBSBI** | SBS- Bioinformatics | 2 | 40 | 60 | 100 |
| 27. | **ONMSC** | NME- Sericulture | 2 | 40 | 60 | 100 |
| | | TOTAL | 25 | | | 800 |

## SEMESTER – V

| | | | | | | |
|---|---|---|---|---|---|---|
| 28. | BZOC6 | Major – Cell Biology | 4 | 40 | 60 | 100 |
| 29. | BZOC7 | Major – Genetics | 4 | 40 | 60 | 100 |
| 30. | BZOC8 | Major – Biochemistry | 4 | 40 | 60 | 100 |
| 31. | BZOC9 | Major – Evolution | 4 | 40 | 60 | 100 |
| 32. | BZOC10 | Major -Environmental Biology | 4 | 40 | 60 | 100 |
| 33. | BZOE3 | **Elective paper-III** Biostatistics | 3 | 40 | 60 | 100 |
| 34. | **SBSOF** | SBS - Ornamental fish culture | 2 | 40 | 60 | 100 |
| | | TOTAL | 25 | | | 700 |

## SEMESTER – VI

| | | | | | | |
|---|---|---|---|---|---|---|
| 35. | BZOC11 | **Major** – Molecular Biology & Genetic Engineering | 4 | 40 | 60 | 100 |
| 36. | BZOC12 | **Major** - Physiology | 4 | 40 | 60 | 100 |
| 37. | BZOC13 | **Major** - Animal, Plant& Environmentalbiotechnology | 4 | 40 | 60 | 100 |
| 38. | BZOP3 | **Major - Practical III** | 4 | 40 | 60 | 100 |
| 39. | BZOP4 | **Major- Practical IV** | 4 | 40 | 60 | 100 |
| 40. | BZOE4 | **Elective paper- IV** Clinical Biology | 3 | 40 | 60 | 100 |
| 41. | **SBSEZ** | SBS-Economic zoology | 2 | 40 | 60 | 100 |
| 42. | BZOEX | Extension Activities | 3 | | | 100 |
| | | TOTAL | 28 | | | 800 |
| | | Grand Total | 140 | | | 4200 |

## B.Sc., ZOOLOGY

## Semester – I

**TOTAL HOURS: 75**

**CORE PAPER – I:** **INVERTEBRATA - I**
**SUBJECT CODE:**

| UNITS | CONTENTS | HOURS |
|---|---|---|
| I | **Introduction to principles of Taxonomy** – Protozoa, Metazoa, Radiata, Bilateria, Acoelomata, Pseudocoelomata and coelomata.<br><br>General characters and classification upto class level with Few examples. | 15 |
| | **Protozoa**<br>Type study: Paramecium – General organization, Cyclosis, contractile vacuoles and reproduction.<br><br>General Topic: Life history, Pathogenicity and control Measures of Entamoeba and Plasmodium. | 15 |
| II | **Porifera:**<br>Type Study: Sycon – Histology, Spicules, Gemmules, Parenchymula larva.<br><br>General Topic: Canal system in sponges. | 10 |
| III | **Colenterata:**<br>Type Study: Obelia – general organization and Metagenesis.<br><br>General Topic: Corals and Coral Reef | 10 |
| IV | **Platyhelminthes**<br>Type Study: Fasciola hepatica – external morphology, digestive, Excretory and reproductive systems and Life history<br><br>General Topic: Parasitic adaptation - Platyhelminth Worms | 15 |
| V | **Aschelminthes**<br>Type Study: Ascaris – Sexual dimormphism – reproductive Systems and Life cycle.<br><br>General Topic: Human nematode parasites – Ancylostoma, Enterobius, Wuchereria. | 10 |

**Text Book**

A Text Book of Invertebrates- N.C.Nair, S. Leelavathy, N.Soundara pandian, T.Murgan, Dr. N. Arumugam, Saras Publication, 2010

**Reference Books:**


1) Invertebrate Zoology, Jordan, E.K. and P.S.Verma. 1993. 12th Edition.S.Chand & Co.Ltd., Ram Nagar, New Delhi.
2) (All Series) Protozoa, Porifera, Coelenterata, Annelida, Arthropoda, Mollusca, Echinodermata, Kotpal, R.I., 1988-1992, Rastogi Publications, Meerut – 250 002.
3) Manual of Zoology Vol. I (Invertebrates). Parts I & II.Ayyar, E.K. and T.N. Ananthakrishnan, 1992. S. Viswanathan (Printers and Publishers) Pvt Ltd. Madras.

## Semester – I

**Core paper – II** **Invertebrata – II** **Total Hrs: 75**

**Subject Code:**

| UNITS | CONTENTS | HOURS |
|---|---|---|
| I | **Annelida**<br>Type Study: Nereis – External morphology, Nephridia, Nervous and reproductive system.<br><br>General Topic: Metamerism in Annelids | 15 |
| II | **Arthropoda**<br>Type Study: Prawn – Penaeus – External Morphology, appendages, digestive system Excretory system, reproductive system and Development<br><br>General Topic: Social life of beneficial insects | 15 |
| III | **Peripatus** and its affinities | 5 |
| IV | **Mollusca**<br>Type Study: Pila – External morphology, Digestive System, Respiratory system, Osphradium and Reproductive system.<br><br>General Topic: Torsion in Gastropoda. | 20 |
| V | **Echinodermata**<br>Type Study: Starfish – External morphology, Pedicellaria, Water vascular system<br><br>General Topic: Larval forms in Echinodermata. | 20 |

**Text Book**

A Text Book of Invertebrates- N.C.Nair, S. Leelavathy, N.Soundara pandian, T.Murgan, Dr. N. Arumugam, Saras Publication, 2010

**Reference Books:**


1. Invertebrate Zoology, Jordan, E.K. and P.S.Verma. 1993. 12th Edition.S.Chand & Co.Ltd., Ram Nagar, New Delhi.
2. (All Series) Protozoa, Porifera, Coelenterata, Annelida, Arthropoda, Mollusca, Echinodermata, Kotpal, R.I., 1988-1992. – Rastogi Publications, Meerut – 250 002.
3. Manual of Zoology Vol. I (Invertibrata). Parts I & II. Ayyar, E.K. and T.N. Ananthakrishnan, 1992. S. Viswanathan (Printers and Publishers) Pvt Ltd. Madras.

## Semester-II

## Chordata

**TOTAL HOURS: 90**

**CORE PAPER – III:**
**SUBJECT CODE:**

| UNITS | CONTENTS | HOURS |
|---|---|---|
| I | General characters and Classification of Chordata up to orders with a few examples | 5 |
| | **Protochordata:**<br>Type study: Amphioxus<br>General Topic: Affinities and systematic position of cephalochordate, Hemichordates and Urochordata. | 10 |
| II | **Pisces**<br>Type Study: Shark<br>General Topic: Accessory respiratory organs in Fishes, Migration of Fishes | 15 |
| III | **Amphibia**<br>Type Study: Frog (Rana hexadactyla)<br>General Topic: Parental care in Amphibia, Neoteny in Amphibia | 15 |
| IV | **Reptilia**<br>Type Study: Calotes vesicolor – External morphology, Circulatory, nervous system, pectoral and pelvic Girdle only<br>General Topic: South Indian Poisonous and non-Poisonous snakes.<br>Identification – Poison apparatus, biting mechanism, Nature of venom, first aid and treatment. | 15 |
| V | **Aves**<br>Type study – Pigeon<br>General Topic: Migration of birds<br>Fossil bird Archaeopteryx as connecting links. | 15 |
| | **Mammalia**:<br>Type Study – Rabbit<br>General Topic: Dentition in Mammals<br>Adaptation of Aquatic mammals. | 15 |

**Text Book:**

A Text Book of chordates – A. Thangamani, S. Prasanna kumar, L.N.Narayanan, Dr. N.Arumugam, Saras Publication, 2010.

**Reference Books:**


1) A Manual of Zoology, volume II – Chordata. Parts I & II. M.Ekambatanatha Ayyar, T. N. Anantha Krishnan, 1992. S.Viswanathan (Printers and Publishers) Pvt.Ltd, Madras.
2) Chordate Zoology, Jordan E. L & Verma P. S., S. Chand & Company Ltd. 1998

## Semester II

**PRATICAL -I - INVERTEBRATA & CHORDATA**

**SUBJECT CODE:** **5Hrs/Week**

## Invertebrata:

**I. Diagram and description of**

1. Earthworm -Nervous System.
2. Cockroach -Digestive system, Nervous System, Reproductive system
3. Pila - Digestive system
4. Frog or calotes -Arterial System.

**II Diagram and description of**

1. Body and penial setae of earthworm.
2. Salivary apparatus & trachea of cockroach.
3. Appendages of prawn
4. Radula of Pila
5. Placoid scales of shark.
6. Brain of frog / Calotes.

**III Spotters:**

**Invertebrata:**

1. Paramecium -entire, binary fission, conjugation.
2. Simple sponge – Gemmule, Spicules
3. Obelia -Colony.
4. Obelia -Medusa.
5. Physalia.
6. Corals – any two
7. Fasciola -Entire.
8. Ascaris - Male & Female
9. Ancylostoma duodenal.
10. *Wuchereria Bancroft.*
11. Nereis.
12. Heteronereis.
13. Prawn - entire, Nauplius, Zoea &Mysis.
14. Peripatus
15. Honey Bee.
16. Silkworm.
17. Headlouse, Flea.
18. Starfish - oral and aboral view

**Chordata**

**Spotters**:

1. Amphioxus,
2. Balanoglossus
3. Ascidian
4. Shark.
5. Hippocampus.
6. Narcine.
7. Anabas
8. Clarius
9. Echeneis,
10. Eel
11. Rhacophorous,
12. Hyla,
13. Bufo
14. Chamaeleon
15. Draco
16. 2 poisonous snakes
17. 2 Non – Poisonous Snakes.
18. Birds – Beak & Feet of any two birds.
19. Bat.
20. Rabbit – Pectoral & Pelvic girdle
    -- Limb Skeleton.

Study tour : Specimen collecting tour is Compulsory for first year students.
Field visit is Compulsory.

**Semester-III** **TOTAL HOURS: 75**

**CORE PAPER - IV: DEVELOPMENTAL BIOLOGY**
**SUBJECT CODE:**

| UNITS | CONTENTS | HOURS |
|---|---|---|
| I | **Definition**: History of Developmental Biology – Theories of Preformation – epigenesis – Von Baer's law and biogenetic theory. Gametogenesis – Spermatogenesis and Oogenesis. | 10 |
| II | Structure of egg and sperm of Amphioxus, frog, Chick and rabbit. Fertilization, Early development, Physicochemical, Cytological and Biochemical aspects of fertilization, Cleavage and its pattern in Vertebrates; Morula – Types of blastula. Gastrulation – Fate maps – morphogenetic Movements – neurula | 25 |
| III | Organogenesis – Development of heart, brain, and eye in chick. Embryonic adaptation: Foetal membranes in Chick – placenta in mammals. | 20 |
| IV | Experimental embryology: Organizer Concept – field and gradients - amphibian metamorphosis and its hormonal Control. Regeneration in planarians and Amphibian. | 15 |
| V | Applied embryology: Test tube babies –Birth control – Artificial insemination –IVF- Techniques in embryo culture. | 5 |

**Text Book:**

A Text Book of Embryology. Dr. N. Arumugam.Saras Publication, 2010

**Reference Books:**

1. Chordate Embryology -P.S .Verma & V.K.Agarwal---S. Chand & Co.1975.
2. Developmental Biology - Arumugam N. Saras Publicaion – kottar. 2007.
3. An introduction to embryology, – Balinsky B.I- W.B.Saunders Co.., Philadelphia, 3rd edt.., 1965.

**Semester – III** **TOTAL HOURS: 60**

**ELECTIVE PAPER: I** **IMMUNOLOGY**

**SUBJECT CODE:**

| Units | Contents | Hours |
|---|---|---|
| **I** | History and scope of Immunology<br>Immunity – Types of Immunity<br>Lymphoid organs – structure and functions of primary and secondary lymphoid organs. | **10** |
| **II** | Cells of the Immune system – their role in immune response.<br>Antigen and antibody interaction<br>Complement activation<br>Immunoglobulin – Structure, types and functions. | **15** |
| **III** | Humoral Immune Response – Primary and Secondary immune response.<br>Cell mediated Immune response | **10** |
| **IV** | Major Histocompatibility Complex (MHC)<br>Human Leucocyte Antigen (HLA)<br>Hyper Sensitivity Types I, II, III, IV and V. | **15** |
| **V** | Immunology<br>Auto Immune diseases – Myasthenia gravis, Lupus erythematosus, Haemolytic anaemia, AIDS.<br>Antibodies and Immunotherapy. | **10** |

**Text Book:**

Immunology & Microbiology, Dulsy Fatima, A. Mani, L.M. Narayanan, A.M.Selvaraj, Dr. N. Arumugam, Saras Publication, 2010

**Reference Books:**

1.Immunology & Immunotechnology, Ashim K. Chakravarth, Published in India by oxford university press, 2006, Jai Singh Road, New Delhi.
2.Immunology, I. Kannan, 2007, MJP Publishers, Chennai- 600005

**Semester-IV** **TOTAL HOURS: 60**

**CORE PAPER - V:** **MICROBIOLOGY**
**SUBJECT CODE:**

| UNITS | CONTENTS | HOURS |
|---|---|---|
| I | **Introduction:-** Definition & Scope of microbiology – Contributions of early microbiologists - General classification of microorganisms. | 10 |
| II | **Culture Techniques:-** Sterilization – Culture media – Culture methods & techniques – Methods of isolation – Staining – Microbial growth & growth curve. | 15 |
| III | **Applied microbiology:-** ***Food microbiology*** – Food spoilage – Food poisoning – Food preservation. ***Industrial Microbiology*** – Alcohol production – Production of Antibiotics – Penicillin and Streptomycin. | 15 |
| IV | **Environmental microbiology:-** Soil microbes – $N_2$ fixation – Biodegradation of pollutants – Xenobiotics – Heavy metal. | 10 |
| V | **Medical microbiology:-** ***Bacterial diseases*** – Tuberculosis – Streptococcal pneumonia – Cholera – Gonorrhea – Syphilis. ***Viral diseases*** – Influenza – Polio – Hepatitis B – AIDS. | 10 |

**Reference Books:**


1.Microbiology P. D. Sharma, Rastogi Publ. Meerut, India, 1998.
2.General Microbiology , Sullia, S. B & Santharam. S, Oxford IBH, India, 2004.
3.Microbiology, Purushotam Kaushik. S . Chand & Co, New Delhi, India, 2005.
4.Microbiology & Immunology, N. Arumugam, Saras Publications,
Nagerkovil, Tamil Nadu, India, 2006.

**Semester - IV**

## Practical II –DEVELOPMENTAL BIOLOGY,MICROBIOLOGY, IMMUNOLOGY & SERICULTURE

**Subject code:** **4 Hours / Week**

### Developmental Biology:

1. Observation of chick blastoderm
   i. 24 hrs ii. 48 hrs iii. 72 hrs iv. 96 hrs
2. Observation and study of different stages of frog embryo
   i. Early cleavage
   ii. Late cleavage
   iii. Blastula
   iv. Gastrula of frog – yolk plug stage

1. Placental types – diffuse, cotyledonary, discoidal and Zonary

### Microbiology

1. Preparation of media – Natural Broth solid media (Agar)
2. Plating techniques – streak plate, pour plate and spread plate
3. Serial dilution techniques
4. Gram's staining
5. Hanging drop experiment
6. Screening of antimicrobial agent ( Krby Bauer Method)
7. Observation of Instruments: Water bath, laminar air flow, autoclave, Incubator, Hot air oven, Colony counter.
8. Spotters: - Bacteria, Fungi, Algae, Spirogyra, Agaricus, Rhizopus, Bread mould, Protozoa – paramecium, Yeast.

### Immunology

1. Observation and study of Lymphoid organs
   i. Bone Marrow
   ii. Bursa fabricious
   iii. Thymus
   iv. Lymph node
   v. Spleen

2. Observation and study of IgG, IgA and IgM

### Sericulture

1. Observation and study of
   i. Silk worm – life cycle, egg, larva, pupa and moth
   ii. Mountage of Netrika
   iii. Silkworm disease and pest – pebrine and uzifly
   iv. Silk gland

Study tour – visit to sanctuaries / parks / sericulture unit /Poultry industry area/ Microbiology and Immunology lab compulsory.

**Semester – III** **TOTAL HOURS: 45**

**ELECTIVE PAPER-I**

**SUBJECT CODE: SERICULTURE**

| UNITS | CONTENTS | HOURS |
|---|---|---|
| I | Introduction to sericulture, moriculture, classification of Mulbery, Methods of cultivation. | 5 |
| II | Silkworm biology – Taxonomy, life cycle, anatomy. Diseases of Bombyx mori – a. Bacterial, b. Fungal c. Viral, Silk worm pest - Uzifly | 10 |
| III | Seed /silkworm eggs. Structure – Commercial and reproductive Seeds, Voltinism, Hiber nating and non hiber nating eggs, | 5 |
| IV | Rearing: Rearing house and appliances, Rearing processes. Chawkiworm rearing – optimum feeding, optimum Environmental conditions, care during rearing and cleaning. Selection of ripeworm, spinning, mounting, Harvesting, storage and transport. | 15 |
| V | Reeling – Stifling, reeling appliances – types of croissures, Country charka, cottage basin, filature units, Applications of silk. | 10 |

**Text Book:**

Applied Zoology- Dr.N.Arumugam, T.Murugan, J.Johnson Rajeshwar, R. Ram Prabhu, Saras Publication, 2010.

## Reference Books:


1. G. Ganga & J. Sulochana Chetty, 1997. An introduction to sericulture (Oxford & IBH bubl.Co.Pvt. Ltd.)
2. Hand Book of Practical Sericulture by Ullal and Narsimhanna. CSB. Bangalore

**Semester - V** **TOTAL HOURS: 75**

**CORE PAPER – VI:** **CELL BIOLOGY**

**SUBJECT CODE:**

| UNITS | CONTENTS | HOURS |
|---|---|---|
| I | **Introduction:**<br>Cell type – prokaryotic and eukaryotic<br>Microscopy:<br>Detailed study of compound, Electron microscopes,<br>X – ray diffraction and phase contrast microscopes. | 10 |
| II | **Cytological Techniques:**<br>Detailed study: Fixation- processing- staining<br>Methods of DNA, RNA, Protein, Lipids and<br>Polysaccharides- Ultracentrifugation | 10 |
| III | Ultra structure and functions of plasma membrane.<br>Mitochondria, Glogi apparatus, Endoplasmic reticulum<br>And Ribosomes.<br>Ultra structure and functions of Lysosomes, Centrioles,<br>Nucleus and Nucleolus, Chromosomes – Structure and types | 20<br><br>20 |
| IV | Cell Division – Mitosis and Mitotic apparatus<br>Meiosis and synaptonemal complex | 10 |
| V | Cancer cells and Carcinogens:<br>Definition – Types – causes – properties – Treatment-<br>Oncogenes. | 5 |

**Text Book:**

Cell Biology & Molecular Biology – Dr. N. Arumugam, Saras Publication,2010

**Reference Books:**


1) "Cell And Molecular Biology"(6th Ed) DeRobertis and DeRobertis,
– W.B. Saunders Co. Philadelphia, 1990.

2) Verma and Agarwal: "Cytology" – S. Chand & Co.Ltd.
Ramnagar, New Delhi. 1991.

**Semester – V**

**CORE PAPER – VII: GENETICS**

| Units | CONTENTS | TOTAL HOURS: 75 HRS |
|---|---|---|
| **I** | Mendel's Experiments.<br>Interaction of genes -- Epistasis,<br>Complementary and supplementary.<br>Multiple alleles – Blood groups - inheritance.<br>Polygenic inheritance – Inheritance of skin colour. | **20** |
| **II** | Linkage & Crossing over in Drosophila.<br>Chromosomal maps. | **15** |
| **III** | Sex chromosomes and sex chromatins<br>Sex determination in Man<br>Sex linked inheritance, sex influenced genes and sex limited genes.<br>Extra chromosomal inheritance. | **25** |
| **IV** | Bacterial transformation – Conjugation -- Transduction – Gene regulation – Genetic Code – Bacteriophages - Structure and Replication. | **10** |
| **V** | Syndromes: Down, Klinefelter, Turner.<br>Inbreeding, Out breeding and Heterosis.<br>Eugenics, Euthenics and Genetic counselling. | **5** |

**Reference Books**:


1. Genetics, P. K. Gupta Rastogi Publications, Meerut, 2001.
2. Genetics, Verma P. S and Agarwal V. K, S. Chand & Co, New Delhi, 1995.
3. Principles of Genetics 8th edition. Gardener. John Wiley & Sons In, Newyork. Chichester, Brisbane, Toronto, Singapore, 1991.
4. Genetics, Monroe W. Strick Berger, Prentice Hall of India, New Delhi, 2004.
5. Genetics. A. M. Winchester, Oxford & IBH Publication Co. New Delhi, 1976.

**Semester - V** **TOTAL HOURS: 75**

**CORE PAPER – VIII:** **Biochemistry**

**SUBJECT CODE:**

| Units | Contents | Hours |
|---|---|---|
| I | - Concepts of $P_H$ and buffer<br>- Oxidation reduction reactions. | 5 |
| II | Carbohydrates: Structure, Classification and Biological importance.<br>Proteins – Structure, Classification and Biological importance.<br>Amino acid – structure and Classifications. Biosynthesis<br>Of amino acids, Catabolism of amino acids.<br>Lipids – Structure, Classification and Biological importance.<br>Cholesterol: Types, Synthesis and Significance. | 40 |
| III | Enzymes:<br>Classification, physico – chemical nature and<br>Mechanism of enzyme action.<br>Factors affecting enzyme activity, Co-enzymes and isozymes. | 10 |
| IV | Vitamins:<br>Classification, Structure & Mechanism only.<br>Hormones : Chemistry of human hormones only. | 10 |
| V | Biochemical Techniques.<br>-- $P_H$ meter<br>-- Colorimeter<br>-- Chromatography<br>-- Electrophoresis. | 10 |

**Text Book:**

Biochemistry and Biotech. Dr. Annie Ragland, N. Arumugam., Saras Publication, 2010

**Reference Books:**


1) Principal of Biochemistry (2006) by Lehinger, Nelson & M.M. Cox, CBS publishers & Distributors, 485, Jain Bhawan, Bhala Nath Nagar, Shahdara, Delhi – 110032. CBS ISBN 81-239-0295-6.

2) Harper's illustrated Biochemistry (2006) – Robert. K. Murray Daryl. K.Granner.
Peter Mayes & Victor W.Rodwell.
Prentice – Hall International.
ISBN 0-8385-361-3.The McGraw-Hill Companies, Inc.

**Semester – V** **TOTAL HOURS: 75**

**CORE PAPER – IX** **Evolution**

**SUBJECT CODE:**

| Units | Contents | Hours |
|---|---|---|
| I | Evidences of evolution (Morphological, Embryological, Physiological, Geographical and Geological) | 25 |
| II | Theories of Evolution – Lamarckism, Darwinism, Neo – Lamarckism, Neo – Darwinism, Mutation theory of Devries modern synthesis. | 10 |
| III | Variation – Sources of Variability – Gene mutation, Chromosomal mutation, recombination and variation, Hybridization, Isolating mechanism. | 15 |
| IV | Micro, Macro and Mega evolution speciation (Allopatric & sympatric ) Mimicry and adaptive colouration. Co – evolution. | 10 |
| V | Human evolution, Horse evolution. | 15 |

**Text Book:**

Organic Evolution – Dr. N.Arumugam, Saras Publication, 2010

**References**:


1. Evolution by savage, II edt, 1973, Amerind pubsing Co.pvt Ltd, New Delhi.
2. Organic Evolution, Rastogi. V.B. - Kadar Nath & Ram Nath, a7th edt, 1988 – 89, Meerut.
3. Process of organic evolution by G. Ledyard Stebbins, II edt, 1973, Praetica-Hall of India Private Ldt, New Delhi.

**Semester – V** **TOTAL HOURS: 75**

**CORE PAPER – X:** **Environmental Biology**

**SUBJECT CODE:**

| Units | Contents | Hours |
|---|---|---|
| I | Physico-chemical factors:<br>Light: Spectra (composition of light),Light on land, light in water. Biological effects of light.<br>Temperature: Range, Diurnal variation, thermal Stratification, temperature tolerance, Classification of Organisms. Adaptation of extreme temperature, Biological effects of temperature.<br>Medium and substratum: Atmosphere and Air; Lithosphere and soil; Hydroshpere and water. | 15 |
| II | Inter specific relationships and intra specific relationships – Types and example, Colonization, Aggregation, Social organization, Psychological Factors<br>Population Ecology: Types, density, and estimation, natality, mortality, age, distribution, growth pattern, fluctuation and equilibrium biotic potential. Dispersal and distribution, Regulation of population | 15 |
| III | Community, characteristics, diversity dominance, structure, Stratification, periodicity, fluctuation, Ecotone and edge effect, Ecological niche, equivalence, ecotypes, ecological succession<br>Ecosystem: Components, food chain and its types- food web, Ecological pyramids.<br>Energy flow and productivity – Examples (Pond and Forests) – Biogeochemical cycles- carbon, Nitrogen and phosphorous. | 15 |
| IV | Habitats: Fresh water, Marine, Terrestrial and Estuarine Habitats<br>Pollution: Kinds, sources of pollution, Hazards of pollution to human, animals, plants and Buildings. /control and remedial measures. Practical Application of ecology in fishery, management, agriculture And forestry. Wild life conservation in India. | 10<br>10 |
| V | Biodiversity: Types and Levels- Species diversity, values Of biodiversity. Causes of erosion of biodiversity. Conservation of biodiversity, Application of remote Sensing in biodiversity. | 10 |

**Text Books:**

Concepts of Ecology (Environmental Biology) - Dr. N. Arumugam., Saras Publication, 2010

Reference Books:


1. Environmental Biology (Principles of ecology) by P.S. Verma & V.K.Agarwal, 2009, ISBN- 81-219-0859-0S. Chand &Co. Ram nagar, New Delhi- 110 055
2. Elements of Ecology by Sharma P.D, 7th edt,(2005), Rastogi Publication, Meerut - 2500002

**Semester: V**

**Elective Paper III: Biostatistics** **Total Hours: 45**

| Units | Contents | Hours |
|---|---|---|
| **Unit I:** | Introduction to Biostatistics, Frequency distribution, Collection of data, Sampling methods, Diagrammatic and Graphical representation. | **10** |
| **Unit II:** | Measures of central tendency – Mean, Median and Mode. Measures of Dispersion: Standard deviation, Standard error, Coefficient of Variation. | **10** |
| **Unit III:** | Probability - Addition theorem and Multiplication theorem, Binomial distribution, Normal distribution and Poison distribution. | **10** |
| **Unit IV:** | Population genetics – Hardy Weinberg law. Chi – square test and student 't' test. | **10** |
| **Unit V:** | Correlation – Definition, Types of correlation, Estimation of unknown value from known value. | **5** |

**Reference Book:**


1. Statistics, S. P. Gupta, S. Chand & Co, New Delhi, 1996.
2. Bio statistics, M. Manohoraa, Palani Paramount Publication, 1992.
3. Introduction to Biostatistics, Pranab kumar Banarjee. S. Chand Company, New Delhi, 2009.
4. Elements of Biostatistics, Satguru Prasad, Rastogi Publication, Meerut, 2012.

**Semester - VI** **TOTAL HOURS: 75**

**CORE PAPER-XI: Molecular Biology & Genetic Engineering**

**SUBJECT CODE:**

| Units | Contents | Hours |
|---|---|---|
| I | Molecular Biology:<br>DNA – as the genetic material, DNA structure, properties and functions. Types of DNA, Base pairs, constancy of DNA, replication, Different types of mutation and DNA repair mechanism – direct reversal, Excision repair, SOS repair, recombination. | 20 |
| II | RNA, Different types of RNA – mRNA, tRNA, rRNA, Processing of the precursor of mRNA | 10 |
| III | Genetic code, Protein synthesis - Transcription in prokaryotes, Translation, Ribosome, Polyribosome, Steps in protein synthesis. The lac operon; positive and negative control. | 10 |
| IV | Genetic Engineering:<br>Introduction, History and scope of Genetic Engineering.<br>Basic steps in Gene cloning, Restriction enzymes.<br>Cloning Vectors -Bacterial plasmids (p BR 322)<br>Bacteriophage Vector – (Lambda) Animal vector – (SV 40) | 15 |
| V | Introduction of DNA into cells. Bacteria – Transformation, Plants –Electroporation, Animals – shot gun method, Liposome mediated fusion. Identification of recombinant hosts – Bacteria, Transgenic plants, Transgenic animals.<br>Application of Recombinant DNA in medicine and industry, Biohazards of recombinant DNA. | 20 |

**Text Book:**

Molecular Biology & Genetic Engineering, L.M. Narayanan, Dr.N. Arumugam, A. Mani, Padmalatha Singh, A.M. Selvaraj, Saras Publication, 2010.

**Reference Books:**


1) Dubey R. C. 2001. A text book of Biotechnology S. Chand & Co, New Delhi. ISBN 81-7133-412-1.

2) Gupta P.K. 1999. Elements of Biotechnology Rastogi publication, Meerut, ISBN 81-7133-412-1.

**Semester – VI** **TOTAL HOURS: 75**

**CORE PAPER – XII** **Physiology**

**SUBJECT CODE:**

| Units | Contents | Hours |
|---|---|---|
| I | **Nutrition, feeding and digestion:**<br>Nutrition – Physiological role of carbohydrate, fats, proteins, vitamins, and minerals.<br>Feeding – Types of feeding – Microphages and Macrophages.<br>Digestion – Role of enzymes in digestion – intra cellular and extra cellular digestion – absorption of digested food materials.<br>Metabolism of carbohydrates, fat and proteins. | 20 |
| II | **Respiration and Circulation:**<br>Respiration – Types of respiratory organs – Respiratory pigments – transport and exchange of gases – control of respiration – biological oxidation anaerobiosis – respiratory quotient<br>Circulation – Structure and function of human Heart (haemodynamic, ECG, Blood pressure) Blood sugars & Blood Urea.<br>Excretion – Origin and Types of Nitrogenous wastes – Ammonotelism, Ureotelism and uricotelism – nephron – urine formation in man. | 25 |
| III | **Homeostasis:**<br>Ionic – Osmoregulation, Euryhaline – Stenohaline – Osmoconformers – Osmoregulators, Osmoregulation in crustaceans, fishes.<br>Thermoregulation: Mechanism of regulation in ectotherms and endotherms – thermoregulation centres. | 5 |
| IV | **Nervous Coordination**:<br>Structure and types of neuron – Synapse, condition of impulse through and across neurons – myoneural Condition – reflex action – conditional reflexes.<br>Receptors and Effectors:<br>Ultra structure of skeletal muscle – physicochemical properties – mechanism of muscles contraction. | 15 |
| V. | **Neuro Endocrine System:**<br>Types of endocrine glands – pituitary, thyroid, parathyroid, adrenal and sex glands – their secretions and role – neurosecretory cells in insects.<br>Reproductive Physiology:<br>Human reproductive cycle and the role of hormones,<br>Birth control measures. | 10 |

**Text Book:**

Animal Physiology- A. Maria Kuttikan, Dr.N. Arumugam, Saras Publication, 2010.

**Reference Books:**


1) Animal Physiology- P.S Verma, B.S.Tyagi, V.K. Agarwal, II edt, 1978, S.Chand & Company Ltd. Ram Nagar, New Delhi – 110 055
2) General comparative physiology by Hoar, S. William, 3rd edt, 1987, Prentice Hall of India Pvt. Ltd. New Delhi, 18 BN-0-87692-337-6.

## Semester - VI

**TOTAL HOURS: 75**

**CORE PAPER – XIII : ANIMAL, PLANT AND ENVIRONMENTAL BIOTECHNOLOGY**

**SUBJECT CODE:**

| Units | Contents | Hours |
|---|---|---|
| I | Origin, History, Scope and Importance of biotechnology in India. Animal cell and Tissue culture: Animal cell, culture media physical, chemical functions of different constituents of culture medium, Role of carbon dioxide, growth factors, Glutamine in culture medium, serum and protein free media and their applications. | 15 |
| II | Types of cell culture; Primary and established culture, Organ culture Disaggregation of tissue, cell separation cell synchronization, Cryopreservation. | 15 |
| III | Plant Biotechnology: Media preparation and sterilization, Micropropagation. Agrobacterium and Crown gall tumors, Ti plasmid vector for transformation | 15 |
| IV | Environmental Biotechnology: Pollution control – waste treatment anaerobic ,aerobic waste treatment, Biodegradation, Microorganism in pollution control. Bioremediation, Biosensors and Biofuels | 15 |
| V | Transgenic animals: production and application. Advantages of Transgenic animals. Transgenic animals in livestock improvement, transgenic in industry, PCR, DNA finger printing, Ethical issues in animal Biotechnology. Stem cell culture - production and application. | 15 |

**Text Book:**

Animal Biotechnology by Prof. V. Kumaresan, Saras Publication, 2010,

## Reference Books:


1) Elements of Biotechnology. P. K. Gupta Rastogi and Co, Meerut. 1998.

2) Plant Biotechnology. S. Ignacimuthu. Oxford and IBH publication Co, New Delhi – 1997.

3) Environmental Biotechnology. S. K. Agarwal, APH Publication Co, New Delhi – 1998.

**SEMESTER VI**

**Practical III – CELL BIOLOGY, GENETICS AND BIOSTATISTICS, ANIMAL PHYSIOLOGY AND EVOLUTION**

**SUBJECT CODE:** **TIME: 5 Hrs / Week**

## CONTENTS

### Cell Biology:

1. Mitosis in onion root tip cells.
2. Identification of meiotic stages in Tredescantia
3. Polytene Chromosomes in Chironomous larva.
4. Preparation of squamous epithelium.
5. Preparations of human blood smear.
6. Model – Mitochondria.

### Genetics and Biostatistics:

1. Calculation of mean, mode, median, variance and standard deviation Using leaves.
2. Study of probability with 2 coins – tossing experiments.
3. Blood group typing.
4. Model - DNA & RNA.
5. Observation of simple mendelian traits

### Animal Physiology:

1. $O_2$ consumption in a fish.
2. Examination of excretory products of fish, bird and mammal and detection of ammonia, urea and uric acid.
3. Counting of different types of blood cells using haemocytometer Demonstration only.
4. Demonstration of blood pressure in Sphygmomanometer.

### Evolution:

1. Variation – Finger Prints.
2. Finding out genetic drift in a small population using beads
3. Vestigial Organ.
4. Fossils.
5. Examples of evolutionary significance of peripatus, Limulus and Archaeopteryx. Animals with adaptive colouration. (Leaf insect, Stick insect, & Chamaeleon).

**SEMESTER VI**

**PRACTICAL - IV** **ENVIRONMENTAL BIOLOGY, BIOCHEMISTRY, BIOTECHNOLOGY AND CLINICAL BIOLOGY**

**SUBJECT CODE:** **TIME: 5 Hrs / Week**

1. Estimation of dissolved oxygen in tap water and distilled water
2. Estimation of dissolved $CO_2$ in water samples.
3. Measurement of hardness of water by using detergent on distilled water and tap water
4. Estimation of salinity in water sample
5. sampling of animal population by using quadrate method
6. Detection of transparency of water by Secchi disc method
7. Animal association- symbiosis, parasitism, predation & commensalisms
8. Analysis and mounting of freshwater and marine planktons
9. Garden / pond / Forest ecosystem
10. Rain water Harvesting / Aquarium
11. Adaptation of aquatic and terrestrial animals based on a study of museum specimen such as rocky, sandy, muddy shore animals, flying and burrowing animals
12. Study tour to the minimum of 3 days duration to be conducted compulsory. Exposing the students to different habitats, pollution areas, thermal hydropower projects, wild life sanctuaries, bird sanctuaries, snake & crocodile parks & report.

## Biochemistry:

1. Effect of temperature on salivary amylase activity
2. Measurement of $P_H$ in various samples using $P_H$ paper & $P_H$ meter.
3. Beer's and Lambert's law verification using colorimeter
4. Aminoacid separation using chromatography method
5. Qualitative tests for Carbohydrates and Lipids.

## Biotechnology:

Observation and study of

a. E. Coli
b. Bateriophage
c. Plasmid
d. Gel electrophoresis
e. PCR
f. SDS – PAGE

## Clinical Biology:

1. Blood Analysis – Hb Estimation
2. Urine Analysis – Detection of Albumin, Sugar and Deposits.
3. Observation and Study of
   a. Entamoeba histolytica
   b. Mantoux test
   c. Immunization Schedule
   d. Ascaris lumbricoids

**Semester: VI**
**Elective paper IV: Clinical Biology**

**Total Hours: 45**

| Units | Contents | Hours |
|---|---|---|
| **Unit I:** | | **5** |
| | Health and hygiene: Nutrition for mother and infants during pregnancy – Breast feeding – Malnutrition, Obesity and causes of BMI. | |
| **Unit II:** | | **10** |
| | Women's Health: Puberty, menstrual cycle, menopause, Osteoporosis, urinary tract infection. | |
| **Unit III:** | | **10** |
| | Infant diseases: Causes, mode of infection, symptoms and treatment of<br>(a) Protozoan diseases – Amoebiasis<br>(b) Bacterial diseases – primary complex<br>(c) Helminthes diseases – round worm.<br>Immunization schedule in India. | |
| **Unit IV:** | | **10** |
| | Clinical analysis: (a) Urine analysis – Detection of sugar, albumin, deposits and pregnancy test (b) Blood analysis – Blood grouping, Haemoglobin estimation, Cell counts DC/TC. | |
| **Unit V:** | | **10** |
| | Aid for (a) Heart attack (b) Electric shock (c) Fire accident<br>d) Burns (e) Snake bite and dog bite (f) Drowning<br>(g) Poisoning,bleeding and shocking (h) Road accident. | |

**Reference books:**


1. Notes on Clinical Lab Techniques, Root & I. Samuel. M. K. G. Iyyer & Sons Publ. Co, Chennai, 1992.
2. Medical Laboratory Technology Vol. 1,2& 3, Mukherjee. Tata McGraw Hill publ. Co, Noida, India, 2006.
3. Medical Laboratory Science. Theory and practice, Ochei, Tata McGraw Hill publ. Co, Noida, India, 2000.
4. A text book of Microbiology, Dubey R. C. and Maheshwari D. K. S. Chand & Co. Publ. New Delhi, India, 2007.

# B.Sc. Zoology

## SBS PAPERS:

1. Vermiculture
2. Bioinformatics
3. Ornamental fish culture
4. Economic Zoology

## Non-Major Elective courses for Other Major students:

1. Apiculture

2. Sericulture

# Skill Based Elective Course For B.Sc. Zoology –

## Semester-III

**SBS -I** **VERMICULTURE**

**2hrs/week**

## Aim and Objectives:

1. To identify the different species of earthworms.
2. To understand the importance of Vermiculture.
3. To acquire knowledge on the uses of vermicastings in organic farming.

**Unit-I:**
Earthworms-Taxonomic position and diversity;
types – Epigeic species, Endogeic species and Anecics.

**Unit-II:**
Vermiculture-definition, scope and importance, common species for culture, Environmental requirements; culture methods-wormery-breeding techniques; Indore and outdoor cultures.

**Unit-III:**
Applications of vermiculture-Vermiculture Biotechnology-vermicomposting, use of vermicastings in organic farming/horticulture-vermiwash.

**Unit-IV:**
Earthworms for management of municipal/selected biomedical solid wastes, as feed/bait for capture/culture fisheries; forest regeneration.

**Unit-V:**
Future perspectives-Potentials and constraints for vermiculture in India.

**Reference Book:**


- Sultan Ahmed Ismail, 2005.The Earthworm Book, 2nd revised edn, Other India press, Goa, India

## IV Semester

## SBS-II Bio-informatics

**2hrs/week**

## Aim and Objectives:

1. To acquire knowledge on the application of computer in Biology.
2. To help the students to experience how the tools can be used in drug designing.

**Unit-I:**
Scope of Bio-informatics-Bio-informatics and Internet-Creation of Websites-
Use of Bioinformatics.

**Unit-II:**
Biological databases-Generalized databases-Sequence and structure of databases-
Primary and secondary databases (protein database only).

**Unit-III:**
File formats-BLAST & FASTA-Data retrieval with Entrez and
SRS-Sequence similarity searches.

**Unit-IV:**
Sequence alignment-Pairwise and multiple sequences Alignment-similarity and Homology.

**Unit-V:**
Bio-informatics and drug discovery-target –lead-ligand-HTS-target searching and
drug designing-Docking.

**Text Book:**
Bioinformatics by R. Sundaralingam, V. Kumaresan, Saras Publication, 2010

**Reference Books**:


- Bio-informatics computing, Bryan Bergeron, Prentice Hall India, Eastern Economic edn.
- Bio-informatics for Beginners by Mani and Vijayaraj, Kalaikathur Achagam.
- Bio-informatics, Westhed.P and Twyman, Viva Books Pvt, LTD.

## Semester V

### SBS-III Ornamental Fish Culture 2hrs/week

Aim and Objectives:

To gain knowledge about ornamental fishes
To motivate students for aquaculture practices.

**Unit-I:**
Construction of home aquarium: materials used wooden and metal frames, frameless tanks. Sealants and gums. Design and Construction of aquarium tank.

**Unit-II:**
Taxonomy and biology of popular ornamental fishes:
Live-bearers (Ovo-viviparous)-red swordtail, platy, guppy and molly.
Egg layers (oviparous)-gold fish, Siamese fighting fish, gourami, angel fish, Oscar, Koi corp, Neon tetra, discus and red tail shark.

**Unit-III:**
Nutritional requirements of Ornamental fishes-
different kinds of feeds-larval feeds and feeding.

**Unit-IV:**
Cleaning the aquarium, maintenance of water quality (temperature,heating,waterchange,ammonia,$O_2$/$Co_2$,$P_H$,water hardness)-
Control of snail and algal growth.

**Unit-V:**
Commercially important marine ornamental fishes,
Entrepreneurships development in ornamental fish culture.

**Text Book:**
Home Aquarium, Dr. C.S. Tharadevei, Dr. K.V. Jayashree, Saras Publication, 2010

**Reference Books:**


- Manual of ornamental fishes and farming technology, J.D.Jameson and R.Santhanam 1996. Fisheries College and Research institute. TANVASU. Tuticorin.
- Manual on freshwater ornamental fish culture, R.Santhakumar *et al;* 2007. Dept of fisheries extension. Fisheries College and Research institute. TANVASU. Tuticorin.
- Biodiversity and stock assessment of marine ornamental fishes, V.K.Venkataramani *et al;* 2004. Dept of Fisheries. Biology and Capture fisheries .Fisheries College and Research institute. TANVASU. Tuticorin-628008.

## Semester-VI

### SBS- IV Economic Zoology

**2hrs/week**

**Aim and Objectives:**

1. To gain knowledge about beneficial Insects, Poultry & Aquaculture.
2. To motivate them to rear beneficial Insects, Animals & start Small Scale Industries.
3. To create awareness on agricultural Pests & Vectors of Human Diseases.

**Unit –I:**

Honey Bee-Types of honey bee-Culture techniques- Diseases of honeybee.

**Unit-II:**

Poultry Industry-Any three indigenous and exotic breeds Diseases of poultry-
Any three poultry products.

**Unit-III:**

Pearl Industry-Types of Pearls-Pearl formation-Culture of pearls-
Pearl producing sites in India.

**Unit-IV:**

Fishery Industry-Common Edible fishes-Economic Importance of fishes.

**Unit-V:**

Dairy Science-Different Breeds- milk and milk products - Pasteurization.

**Text Book:**

Applied Zoology by Dr. N. Arumugam, T. Murugan, J, Johnson Rajeshwari,
R. Ram Prabhu, Saras Publication, 2010.

**Reference Books:**

Economic zoology by jawaid Ashan, Subhas Prasad Sinha (1995), S.Chand & Company Ltd,
Ram nagar, New Delhi - 110055

# Semester III
# Non Major Elective 1 – Apiculture

**Unit- I** **2hrs/Week**

Introduction to Apiculture – Scope of Apiculture. Honey bee – Classification, types of honey bees – *Apis dorsata, Apis florae, Apis indica* and Dammer bee

**Unit- II**

Bee colony- function of members – Different kinds of cells, Bee hive and its architechture, communication in bees.

**Unit – III**

Apis indica – social life in Indian honey bee. Morphology of Queen, Drones and Workers.

**Unit – IV**

Bee keeping – methods of bee keeping in India – Primitive hives – wall type, movable type, bamboo hive. Modern hives – longstroth ten frame hive, Newton's hive. Appliances use in bee keeping.

**Unit – V**

Economic importance of bee products – chemical composition, Nutritive value and medicinal uses of honey, bee wax, bee venom and disease of honey bees.

**Reference Books:**


1. Applied Zoology Dr. N. Arumugam, Dr. S. Murugan, Dr. J. Johnson Rajeshwar and Dr. R. Ram Prabhu, Saras Publication, Nagerkovil, (2005).
2. A text book of Economic Zoology Ravindranathan K. R, Dominent Publishers and distributors, New Delhi. (2005).
3. Entomology M. S. Nalina sundari M. J. P Publications, Chennai, 2006.
4. Hand book of Bee Keeping, Sharma P.L & Singh S. Agrobius Publ, India, 2001.
5. A text book of Economic Zoology. Ravindranathan K. R. Dominent Publishing & distributors, New Delhi, 2005.

# Semester IV
# Non Major Elective 2 – Sericulture

**2hrs/ week**

**Unit-I:**
Introduction to Sericulture: Moriculture-Classification of mulberry:
Methods of Cultivation.

**Unit-II:**
Silkworm biology-Taxonomy, Life-cycle-Diseases of *Bombyx mori* –
A) Pebrine B) Muscardine, Silkworm pest-Uzi fly.

**Unit-III:**
Silkworm eggs/seeds-Commercial and reproductive seeds. Voltinism.
Hibernating and Non-hibernating eggs.

**Unit-IV:**
Rearing: Rearing house and appliances-Chawkiworm rearing, rearing processes.

**Unit-V:**
Reeling-reeling appliances. Country Charka, Cottage basin, Filature units.

**Text Book:**
Applied Zoology by Dr. N. Arumugam, T. Murugan, J, Johnson Rajeshwari, R. Ram Prabhu
Saras Publication, 2010.

**Reference Books:**


- An Introduction to Sericulture-. G. Ganga & J. Sulochana Chetty, 1997.
  (Oxford & IBH bubl.Co.Pvt. Ltd.)
- Hand Book of Practical Sericulture by Ullal and Narsimhanna. CSB.
  Bangalore
- Manual of Sericulture-Rearing, Reeling, Moriculture.

**MOTHER TERESA WOMEN'S UNIVERSITY**
**KODAIKANAL - 624102.**

**B.Sc., ANCILLARY ZOOLOGY Syllabus.**
**2015-2016 ONWARDS**

**SEMESTER-I:**

**PAPER-I : - Ancillary Paper I**
**SUBCODE:-BAZO1**
**SEMESTER-II:**
**PAPER-II: - Ancillary Practical-I**
**SUBCODE:-BAZO2**

## B.Sc. ANCILLARY ZOOLOGY

## ANCILLARY PAPER I

**SEMESTER-I** **TOTAL HOURS: 75 hrs.**

| **SUB CODE:** | | **Hours** |
|---|---|---|
| **I** | **INVERTEBERATA** | |
| | Study of the following types with their diagnostic characters of the phyla and classes to which they belong. a) Amoeba b) Ascaris c) Starfish | 15 |
| | Life history, transmission and control measures of plasmodium and filarial worm. | 5 |
| **II** | **CHORDATA** | |
| | Classification of chordates up to classes with their diagnostic Characters - Two examples from each class | 5 |
| | Identification and significance of any 5 edible fishes<br>Snakes- Identification of poisonous and non-poisonous Snakes-<br>Mechanism of bite-venom and action, first aid for snake bite. | 10 |
| **III** | **CYTO GENETICS**<br>Mitosis and Meiosis.<br>Laws of Mendel and common Mendelian traits in man. | 10 |
| **IV** | **PHYSIOLOGY & EMBRYOLOGY**<br>Endocrine glands – Pituitary and thyroid.<br>Excretion-Structure of nephron-Physiology of excretion.<br>Development of frog upto gastrulation.<br>Test tube babies-Birth control-Aritificial insemination-IVF. | 20 |
| **V** | **EVOLUTION**<br>Theories of Lamarck<br>Darwinism and Neo-Darwinism.<br>Speciation-Allopatric, Sympatric. | 10 |

**Text Book:**


1. A Text Book of Invertebrates- N.C.Nair, S. Leelavathy, N.Soundara pandian, T.Murgan, Dr. N. Arumugam. Saras Publication, 2010.
2. A Text Book of chordates – A. Thangamani, S. Prasanna kumar, L.N.Narayanan, Dr. N.Arumugam Saras Publication, 2010.
3. Physiology, Biochemistry, Developmental Biology, Microbiology & Evolution, Dr. Arumugam, Saras Publication, 2010.


**Reference Books:**


1. Manual of Zoology Vol. I (Invertibrata). Parts I & II. Ayyar, E.K. and T.N. Ananthakrishnan, 1992. S. Viswanathan (Printers and Publishers) Pvt Ltd. Madras.
2. A Manual of Zoology, volume II – Chordata. Parts I & II. M.Ekambatanatha Ayyar, T. N. Anantha Krishnan, 1992. S.Viswanathan (Printers and Publishers) Pvt.Ltd, Madras.

. 3. Cell Biology, Power C.B.1981, Himalaya Pub.Co., Bombay.
4. A Text Book of Genetics Rastogi V.B, 1997. Kedar Nath Ram Nath. Meerut.
5. Animal Physiology Verma P.S., Tyagi B.S and Agarwal V.K., 1997. S.Chand and Co., NewDelhi.
6. Organic Evolution Rastogi V.B., 1996. Kedar Nath Ram Nath. Meerut.
7. Development Biology Berill N.J., 1986. Mc Graw Hill, New Delhi.

## ANCILLARY PRACTICAL – I

**SUB CODE:**

**Invertebrata & chordata**:

**Diagram and description of**

| | | |
|---|---|---|
| 1. Earthworm | - | Body and penial setae |
| 2.Cockroach | - | Digestive system and Nervous system. |
| 3.Frog | - | Arterial system and Brain. |

**Cytogenetics** -
1. Human /frog blood smear
2. Mitosis in Onion root tip cells.
3. Observation of simple mendelian traits

**Embryology** - Frog cleavage, blastula and gastrula.

**Evolution** - **Fossils:** Peripatus, Limulus
**Analysis of variation** - finger prints.

**Spotters:-**

Amoeba.
Ascaris entire (male & female).
Filaria bancrofti.
Starfish oral and aboral view.
Amphioxus.
Narcine.
Clarius.
Rhacophorus.
Chamaeleon.
2 poisonous snakes.
2 Non poisonous snakes.