

**VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)
DEPARTMENT OF ZOOLOGY
B.Sc. DEGREE COURSE IN ZOOLOGY
CHOICE BASED CREDIT SYSTEM
Rules and Regulations, Course Scheme and Scheme of Examination governing the B.Sc.
Degree Course in ZOOLOGY
(For those admitted in June 2014 and later)**

I. AIM AND SCOPE OF THE COURSE

- ❖ To instill knowledge across different areas of animal science.
- ❖ Provides an opportunity to familiarize with the life cycles and mode of reproduction in different animal groups.
- ❖ The topics included in different units of different papers would enable the students to develop technical skills in zoological and allied branches.
- ❖ Skill based subjects like Ornamental fisheries, Agriculture Entomology, Sericulture, Apiculture, Aquaculture, Biotechnology, Poultry Science and Vermiculture Technology have been included in order to provide opportunities in employment and research in Government and Private organizations.
- ❖ There is also scope for self-employment for the students.
- ❖ □Students will understand the importance of animals in the biosphere.
- ❖ Practicals included in the syllabus will improve the skills of students in microscopy, observation, drawing and laboratory techniques.

II. SALIENT FEATURES

- ❖ Course is specially designed for self employment.
- ❖ Special Guest lectures from Government Officials, Scientists, Professors and Research Experts will be arranged.
- ❖ Special Industry Orientations and Training are parts of the Degree Course.
- ❖ Project work is included in the syllabus to enhance conceptual, analytical & deductive skills.

III. ELIGIBILITY FOR ADMISSION

Candidates seeking admission into the B.Sc. Degree course in Zoology must have passed the Higher Secondary Examinations, conducted by the Board of Higher Secondary Education, Government of Tamil Nadu or any other examinations accepted by the Syndicate of the Periyar

University Salem as its equivalent with Zoology or Biology and Chemistry as course subjects in part III.

IV. DURATION OF THE COURSE

- The duration of the course shall be three academic years comprising of six semesters in to two semesters for each academic years.
- Each semester consists of 90 working days.

V. CONTINUOUS INTERNAL ASSESSMENT (CIA)

The performance of the students will be assessed continuously and the Internal Assessment Marks for theory will be as under:

1. Average of two Tests - 15 Marks
2. Assignment - 5 Marks
3. Attendance - 5 Marks

Total = 25 Marks

Internal Assessment Marks for practical will be as under:

1. Attendance - 10 Marks
2. Observation Note - 10 Marks
3. Model Exam - 20 Marks

Total = 40 Marks

Attendance Breakup

THEORY:

Range	Marks
76-80	1
81-85	2
86-90	3
91-95	4
96-100	5

PRACTICALS:

Range	Marks
76-80	2
81-85	4
86-90	6
91-95	8
96-100	10

VI. DISTRIBUTION OF MARKS

THEORY:

Internal Assessment - 25 marks

External Examination - 75 marks

PRACTICALS:

Internal Assessment - 40 marks

External Examination - 60 marks

VIII. ATTENDANCE

Each student must put in a minimum attendance of 75% of working days of the college in each semester so as to become eligible to appear for the Terminal Examinations. A student of the first or second year under-graduate class should, in addition to this, put in a minimum attendance of 75% in any of the co-curricular activities namely Physical Education, N.S.S., YRC and Red Ribbon Club in each semester to eligible to write the examinations in the respective semesters. Shortage of attendance in co-curricular activities Physical Education, N.S.S., YRC and Red Ribbon Club should

be compensated in the ensuing semesters to become eligible to write the Terminal Examinations concerned.

Shortage of attendance in regular classes on the part of any student, not exceeding 10% below the prescribed minimum of 75% may be condoned on medical grounds. Such condonation shall be granted by the Principal on merits. The application for condonation shall be accompanied by a condonation fee, prescribed by the Principal. If a student earns less than 75% attendance in the regular classes in a particular semester and is found either ineligible for condonation of shortage of attendance or is not granted condonation, then the student will not be permitted to appear for the Terminal Examinations and the student will have to repeat that semester.

IX. TRANSITORY PROVISION:

Candidates who were admitted to the UG course of study before 2015-2016 shall be permitted to appear for the examinations under those regulations for a period of three years i.e., up to and inclusive of the examination of April/May 2015. Thereafter, they will be permitted to appear for the examination only under the regulations then in force.

X. SYLLABUS WITH EFFECT FROM: 2015-2016 onwards

COURSE SCHEME AND SCHEME OF EXAMINATIONS
B.Sc. DEGREE COURSE IN ZOOLOGY
CHOICE BASED CREDIT SYSTEM
(For those admitted in June 2014 and later)

Sem	Subject Code	Part	Course	Subject Title	HRS/Week	Credit	Int. Mark	Ext. Mark	Mark
I	14U1LT01	I	Languages	Tamil or anyone Language – I	6	3	25	75	100
	14U1LE01	II	Languages	Communicative English I	6	3	25	75	100
	14U1ZOC01	III	Core I	Invertebrata	6	5	25	75	100
	14U2ZOC01	III	Core Practical-I	Invertebrata & Chordata	3	-	-	-	-
	14U1BOA01	III	Allied Paper	Allied Botany Theory-I	4	3	25	75	100
	14U2BOAP01	III	Allied Practical-I	Allied Botany Practical	3	-	-	-	-
	14U1VE01	IV	Value Education	Yoga- Value Education	2	2	25	75	100
Total					30	16	125	375	500
II	14U2LT02	I	Languages	Tamil or anyone Language – II	6	3	25	75	100
	14U2LE02	II	Languages	Communicative English II	6	3	25	75	100
	14U2ZOC02	III	Core II	Chordata	6	5	25	75	100
	14U2ZOC01	III	Core Practical I	Invertebrata & Chordata	3	4	40	60	100
	14U2BOA02	III	Allied Paper	Allied Botany Theory-II	4	3	25	75	100
	14U2BOAP01	III	Allied Practical -I	Allied Botany Practical	3	3	40	60	100
	14U1ES01	IV	-	Environmental Studies	2	2	25	75	100
Total					30	23	205	495	700
III	14U3LT03	I	Languages	Tamil or anyone Language – III	6	3	25	75	100
	14U3LE03	II	Languages	Communicative English III	6	3	25	75	100
	14U3ZOC03	III	Core III	Cell Biology	4	5	25	75	100
	14U4ZOC02	III	Core Practical- II	Cell Biology & Genetics	3	-	-	-	-
	14U3CHA01	III	Allied Paper	Allied Chemistry Theory -I	4	3	25	75	100
	14U4CHAP01	III	Allied Practical	Allied Chemistry Practical	3	-	-	-	-
	14U3ZOS01	IV	SBEC-I	Ornamental Fisheries	2	2	25	75	100
	14U3BON01	IV	NMEC- I	Mushroom Cultivation	2	2	25	75	100
Total					30	18	150	450	600
IV	14U4LT04	I	Languages	Tamil or anyone Language – IV	6	3	25	75	100
	14U4LE04	II	Languages	Communicative English IV	6	3	25	75	100
	14U4ZOC04	III	Core IV	Genetics	4	5	25	75	100
	14U4ZOC02	III	Core Practical II	Cell Biology & Genetics	3	4	40	60	100
	14U4CHA02	III	Allied Paper	Allied Chemistry Theory -II	4	3	25	75	100
	14U4CHAP01	III	Allied Practical	Allied Chemistry Practical	3	3	40	60	100
	14U4ZOS02	IV	SBEC-II	Agriculture Entomology	2	2	25	75	100
	14U4BON02	IV	NMEC-II	Herbal Botany	2	2	25	75	100
Total					30	25	230	570	800
V	14U5ZOC05	III	Core V	Animal Physiology	5	5	25	75	100
	14U5ZOC06	III	Core VI	Developmental Biology	5	5	25	75	100
	14U5ZOC07	III	Core VII	Microbiology and immunology	5	5	25	75	100
	14U6ZOC03	III	Core Practical-III	Animal Physiology, Developmental Biology and Microbiology	3	-	-	-	-
	14U6ZOC04	III	Core Practical-IV	Evolution and Ecology	3	-	-	-	-
	14U5ZOE01	III	Elective-I	Biotechnology	5	5	25	75	100
	14U5ZOS03	IV	SBEC-III	Sericulture	2	2	25	75	100
	14U5ZOS04	IV	SBEC-IV	Vermi Technology	2	2	25	75	100
Total					30	24	150	450	600
VI	14U6ZOC08	III	Core Course VIII	Evolution	5	5	25	75	100
	14U6ZOC09	III	Core Course IX	Ecology	5	5	25	75	100
	14U6ZOC03	III	Core Practical-III	Animal Physiology, Developmental Biology and Microbiology	3	5	40	60	100
	14U6ZOC04	III	Core Practical-IV	Evolution and Ecology	3	4	40	60	100
	14U6ZOE02	III	Elective-II	Biochemistry	5	5	25	75	100
	14U6ZOE03	III	Elective-III	Medical Laboratory Techniques	5	5	25	75	100
	14U6ZOS05	V	SBEC-V	Poultry Science	2	2	25	75	100
	14U6ZOS06	IV	SBEC-VI	Aquaculture	2	2	25	75	100
	14U6EX01	V	Extension Activities		-	1	-	-	-
Total					30	34	230	570	800

INVERTEBRATA

UNIT: I (15 Hours)

A brief introduction and Nomenclature – Level of organization in Animal Kingdom (Linnaeus). *Phylum*: Protozoa: General characters – Classification – Type study – **Paramecium** – Structure and Reproduction. General topic – Protozoan disease of Human.

UNIT: II (15 Hours)

Phylum: Porifera: General characters –Type Study– **Ascon** – Cellular structure. *Phylum*: Coelenterata – Classification – Type Study - **Aurelia** – Structure and life history. General Topics Canal System in Sponges – polymorphism in Coelenterates.

UNIT: III (20 Hours)

Phylum: Platyhelminthes – General characters – Classification – Type study –Liver fluke- Structure, Life cycle and Reproduction.

Phylum: Annelida – General Characters – Type study – **Nereis** – External morphology and Reproduction. General Topics: Helminth Parasites of Man

UNIT: IV (15 Hours)

Phylum: Arthropoda – General characters – Type study – Mosquito– External morphology and Reproductive System. Larval forms of Insects.

Phylum: Mollusca: General characters – Type Study – Unio (Lamellidens) –**Pila** - Nervous system, External morphology, digestive system and reproductive system. General Topic: “Economic Importance of Mollusca”.

UNIT: V (15 Hours)

Phylum: Echinodermata: General characters – Type – **Asterias rubens** (starfish) – External morphology water vascular system in star fish. General Topic: Larval forms of Echinoderms.

TEXT BOOK:

1. N.C. Nair, S. Leelavathy, N. Soundarapandian, T. Murugan, N. Arumugam (2004) A Text Book of Invertebrates (Saras Publication) Nagercoil.
2. Kotpal R.L. (2003) Modern Text Book of Zoology – Invertebrates, Rostogi Publication, Meerut

REFERENCE BOOKS:

1. Agarwal V.K. (2000) Invertebrate Zoology – S. Chand and Company Ltd., publications, New Delhi.
2. Barnes R.D. (1987) Invertebrate Zoology – Saunders College publications.
3. Barrington E.J.W., (1981) Invertebrate structure and function – ELBS edition.
4. Ekambaranatha Iyer (1993) Manual of Zoology – Vol. I. Invertebrata. S. Viswanathan (Printers & Publisher) Chennai.

B.Sc. ZOOLOGY

Semester- II

Core Paper- II

Code: 14U2ZOC02

Hrs/Week: 6

Credits: 5

CHORDATA

UNIT: I (20 Hours)

Introduction - Type study: **Amphioxus** - External Characters, Digestive, Excretory, Respiratory and Circulatory systems.

Class: Pisces, General Characters - Type study: **Scoliodon** – External Characters, Digestive, Excretory, Respiratory and Circulatory systems – Structure of Brain - Sense organs Reproductive System. General Topic: Accessory respiratory organs in fishes.

UNIT: II (20 Hours)

Class: Amphibia: General Characters - Type Study: **Frog** – External Characters - Digestive, Respiratory, Circulatory and Reproductive systems -Structure of brain.

Class: Reptilia: General Characters - Type Study: **Calotes** – External characters - Digestive, Respiratory, Circulatory and Reproductive System - Structure of Brain. Parental care of Amphibian. General Topic: 1) Identification of poisonous and non-poisonous snakes.

UNIT: III (10 Hours)

Class: Aves - General Characters - Type Study **Pigeon** – External Characters - Digestive, Respiratory, Circulatory and Reproductive system - Structure of Brain.

General Topic (1) Flight adaptations in Birds. (2) Migration in Birds.

UNIT: IV (15 Hours)

Class: Mammalia - General Characters - Type Study. **Rabbit** – External Characters - Digestive, Respiratory, Circulatory, Excretory and Reproductive systems - Structure of Brain.

General Topic (1) Dentition in Mammals (2) Aquatic Mammals.

UNIT: V (10 Hours)

Comparative Study of Organ systems in vertebrates (Digestive, Respiratory, Circulatory, Excretory and Reproductive systems) - Comparative Study of Fore and Hind limbs of Vertebrates.

TEXT BOOK:

1. N. Arumugam (1987) A Text Book of Chordates (Saras Publication), Nagercoil.
2. Jordan, E.L & Verma, P.S. (2003) Chordate Zoology, S. Chand & Co, New Delhi.

REFERENCE BOOKS:

1. Ekambaranatha Iyer (1993) Manual of Zoology Vol. II, Viswanathan (Printers & Publishers), Chennai.
2. Chaki, K.K. Kundu, G. & Sarkar, S. (2005). Introduction to General Zoology. Vol. 1. New Central Book Agency (P) Ltd. Kolkata.

3. Kardong, K. V. (2002). *Vertebrates: Comparative anatomy, function evolution*. Tata McGraw Hill.
4. Hildebrand, M. (1995). *Analysis of Vertebrate Structure*. John Wiley & Sons.
5. Kent, G. C. & Carr, R. K. (2001). *Comparative anatomy of the Vertebrates*. 9th Ed. Mc Graw Hill.

INVERTEBRATA & CHORDATA PRACTICALS

I. Major Practicals: (20 Marks)

1. Cockroach – Nervous system (Voucher Specimen)
2. Cockroach – Digestive system (Voucher Specimen)
3. Frog – Digestive system and circulatory system. (Voucher Specimen)
4. Insect- Nervous system. (Voucher Specimen)

II. Minor Practicals: (10 Marks)

5. Earthworm body setae
6. Mouth parts of mosquito and Cockroach.
7. Frog – Brain Mounting. (Voucher Specimen)

III. Spotters: (20 Marks)

8. Classify Giving Reasons: Amoeba, Paramecium, Aurelia, Chaetopterus, Halothuria, Amphioxus, Salpa, Bufo, Limulus and Viper.
9. Drawing of Labelled Sketches: Fasciola, T.S. of Fasciol, Ephyra larva, quill feather, pigeon-pectoral girdle, pelvic girdle.
10. Biological significance of the following: Sponge Gemmule, Physalia, Leech, Bipinnaria Larva, Ichthyophis, Ascidian tadpole.
11. Relating structure and function of the following: Spicules (Sponges), Starfish – tube feet, Antennule of prawn, pristin, Echinis, Bat and Cobra.
12. Comment on Respiratory / Skeletal structure / dentition of the following: Starfish, Synsacrum, Dentition of rabbit and Dog.

IV. Record (10 Marks)

INVERTEBRATE AND CHORDATE ZOOLOGY

UNIT: I (10 Hours)

Protozoa: External Morphology of Paramecium –Conjugation.

Porifera: Cellular Structure of Leucosolonia.

Coelenterata: External morphology of Aurelia and its life history

General Topic: Protozoan Parasites – Beneficial and Harmful

UNIT: II (8 Hours)

Platyhelminthes: External structure of *Fasciola Hepatica* and Excretory system

Annelida: ‘Leech’ – Digestive system and excretion.

General Topic: Human Helminth Parasite.

UNIT: III (12 Hours)

Arthropoda: External Morphology of Penaeus

Mollusca: External Structure of Fresh water mussel and Digestive system.

Echinodermata: Star fish – External structure

General Topic: Water vascular system.

UNIT: IV (10 Hours)

Chordata: Hemichordata: External Morphology of Amphioxus and Digestive system.

Pisces: External morphology of ‘Shark’ – Digestive system of shark.

Amphibia: Frog- External Structure and Respiratory system.

General Topic: Parental care in Amphibia.

Reptilia: Identification of poisonous and Non poisonous snakes.

UNIT V (10 Hours)

Aves: Pigeon – Digestive System and Respiratory System.

General Topic: Flight adaptation of birds

Mammalia: Rabbit – Digestive system and Structure of Brain.

REFERENCE BOOKS:

1. Agarwal V.K. (2000) Invertebrate Zoology – S.Chand and Company Ltd., publications, New Delhi.
2. Ekambaranatha Iyer (1993) Manual of Zoology –Vol. I &II Invertebrata, S. Viswanathan (Printers & Publisher) Chennai.
3. Kotpal R.L. (2003) Modern text book of Zoology – Invertebrates, Rostogi publication, Meerut
4. Jordan, E.L & Verma, P.S. (2000) Chordate Zoology, S. Chand & Co, New Delhi.

B.Sc. BOTANY

Semester- II
Allied Paper- II
Code: 14U2ZOA02

Hrs/Week: 4
Credits: 3

ALLIED ZOOLOGY

UNIT: I (10 Hours)

Cell Biology: Structure of Animal Cell - Structure and function of Plasma Membrane and Mitochondria. Significance of Mitosis and Meiosis.

Genetics: Mendelian Laws of Inheritance.

UNIT: II (12 Hours)

Developmental Biology: Types of Eggs - Fertilization and Cleavage. Gastrulation in Frog.

UNIT: III (8 Hours)

Physiology: Digestion & Excretion in man.

UNIT: IV (10 Hours)

Ecology: Pond Ecosystem - Animal Associations - Pollution (Air, Water & Noise)

UNIT V (10 Hours)

Evolution: Lamarkism and Neo-Lamarkism, Darwinism and Neo-Darwinism

TEXT BOOKS:

1. Bernice Anantharaj - Allied Zoology
2. De Robertis EDP and De Robertis EMF. (1996) Cell & Molecular Biology. BI Wauerly Pvt. Ltd, New Delhi.
3. Verma P.S. and Agarwal V.K. – Concepts of Genetics
4. Richard W. Hill, Gordon A. Wyse (2004) Animal Physiology, Second Edition, Sinauer Associate, Inc Publishers, USA.
5. Lewis Wolpert (2007) Principles of Development (III edition) Oxford University Press, UK.
6. Verma, P.S. and Agarwal, V.L. (2005) Concepts of Evolution S. Chand & Company, New Delhi.

ALLIED ZOOLOGY PRACTICAL

I. Major Practicals: (20 Marks)

1. Cockroach – Digestive (Voucher Specimen)
2. Cockroach – Nervous system (Voucher Specimen)
3. Frog – Digestive system (Voucher Specimen)
4. Frog – Reproductive system (Voucher Specimen)

II. Minor Dissection and Mounting: (10 Marks)

5. Earth worm - Body setae
6. Honey bee - Mouth parts
7. Mosquito - Mouth parts
8. Prawn – Appendages (Diagramatic presentation only)
9. Frog - Brain Mounting (Diagramatic presentation only)

III. Spotters: (20 Marks)

10. Comment on

Amoeba, paramecium, Aurelia, Fasciola hepatica, Ephyra larva, Taenia solium, Taenia scolex, Fasciola hepatica. C.S., Ascaris – Male & Female, Amphioxus, Shark, Ichthyophis, Cobra, Sea anemon on hermit crab, pigeon, Blastula of frog, 24 hours of chick embryo, 48 hours of chick embryo, star fish, Redia / Cercaria, Nauplius, Mysis Larva.

IV. Submission of Record (10 Marks)

CELL BIOLOGY

UNIT: I (12 Hours)

Introduction - Cell, Discovery of cell, Structure and functions of animal cell, **Plasma membrane** - Ultra structure – Models of plasma membrane - Chemical composition and functions. **Endoplasmic reticulum** - Morphology, Ultra structure, Chemical composition and functions. **Golgi Complex** - Ultra Structure, Chemical composition and functions.

UNIT: II (12 Hours)

Lysosomes: Introduction - Ultra Structure and types of lysosome - Chemical composition and functions: **Structure and functions of micro bodies** - Peroxisomes and Glyoxysomes. **Mitochondria:** Ultra Structure – Chemical composition – functions – Oxidation – Respiratory chain (ETP) – Krebs's cycle, ATP production.

UNIT: III (12 Hours)

Ribosomes: Ultra structure - types-chemical composition - functions. **Nucleus:** Ultra structure of Nucleus and functions. **Nucleic Acids:** DNA - Ultra Structure - replication - transcription, RNA - types- Genetic code - Protein synthesis.

UNIT: IV (12 Hours)

Chromosomes - Ultra Structure of Chromosomes and Giant Chromosomes **Cell Divisions:** Mitosis, Meiosis and Significance and Salient features of Cell Cycle. **Cancer biology:** Types of Cancer, Oncogenes.

UNIT: V (12 Hours)

Cell Biology techniques: Principles and Applications of Phase contrast microscope. Cell fractionation - Isolation of sub cellular components - Fixation - Sectioning Principles - **Biochemical techniques** – Chromatography - Electrophoresis and their application.

TEXT BOOKS:

1. Cell Biology, Veer Bala Rostogi, Rostogi Publications, Meerut.

REFERENCE BOOKS:

1. De Robertis EDP and De Robertis EMF. (1996) Cell & Molecular Biology. BI Wauerly Pvt. Ltd, New Delhi.
2. Karp, G.Ccell (1996) Molecular Biology- Concept and Experiments, Jhon Wiley & Sons Inc, New York.

ORNAMENTAL FISHERIES

UNIT I: (6 Hours)

Introduction - Ornamental fisheries, Construction of fish tanks, seating the tank, Ornamental fish tank with biological filter, placing the tank.

UNIT II: (6 Hours)

Setting up of tanks – Bottom gravel, planting with plants, filling water and maintenance stocking of fishes.

UNIT III: (6 Hours)

Accessories for fish tank – Hood and light sources, Nets, suction tube, scrapper tool, aerator, lights, filters, filtration, maintenance of water quality, Under water bottom filter, Under gravel filter, Poly foam filter, Carbon filter. Diseases and treatment methods.

UNIT IV: (6 Hours)

Popular ornamental fishes – Egg laying fishes - Siamese fighting fish, Chinese paradise fish, Live-bearing fishes – Sail fin molly, Black molly. Transporter fishes – oxygen packing, Anesthetics used in fish transport, mechanism of action. Transport of export consignment - Preparing of fishes.

UNIT V: (6 Hours)

Food and feeding – Culture of live food organisms – Infusorians, Zooplankton, Copepods. Feeding – Balanced diet for aquarium fishes. Breeding – Introduction, Oviparous fishes, Angel fish. Economic commercial farming.

REFERENCE BOOKS:

1. Jhingran, V.G. (1982) Fish and Fisheries in India. Hindustan Publishing Corporation, New Delhi.
2. Jameson, J.D and Santhanam. R. (1996). Manual of ornamental fishes and farming technologies. Tamilnadu Veterinary and Animal Science University, Tuticorin.

B.Sc. BOTANY

Semester- III
NMEC- I
Code: 14U3ZON01

Hrs/Week: 2
Credits: 2

SERICULTURE

UNIT: I (6 Hours)

GENERAL ASPECTS OF SILKWORMS: Types of silkworms - mulberry, tasar, muga, eri-morphology and life cycle of silkworms. Uses of silkworm, sericulture in India. Future scopes.

UNIT: II (6 Hours)

MULBERRY CULTIVATION: Moriculture, Morphology of mulberry plant, Selection of land and cultivation of mulberry, Mulberry varieties, Different methods of planting, Organic and Inorganic manure application, Pruning – Objectives.

UNIT: III (6 Hours)

SILKWORM REARING: Rearing houses and appliances, Pest and diseases of silkworm and preventive measures, Egg transportation and incubation – Egg handling – Hatching – Brushing – Silkworm rearing techniques. Feeding according to the stages- Harvesting of cocoon and cocoon assessment.

UNIT: IV (6 Hours)

GRAINAGE TECHNIQUES: Egg production – Hibernation Acid treatment of hibernating eggs – Loose egg production – Materials required for grainage techniques.

UNIT V: (6 Hours)

SILK REELING: Reeling methods – Re-reeling – Silk examination, cleaning, lacing, skeining , book making – grading of silk- Marketing.

Field visit to silkworm rearing place & reeling industry.

TEXT BOOKS:

1. An Introduction to Sericulture (IIInd edition) G. Ganga & Sulochana chetty.
2. Rangaswamy .G. (1987).Manual on sericulture FAO, Vol I-IV, Agriculture service Bulletin, CSB, Bangalore , India.

REFERENCE BOOKS:

1. Dandin .S.B (2004), Handbook of new sericulture technologies, Central Silk Board, Bangalore, pp287.

B.Sc. ZOOLOGY

Semester- IV
Core Paper- IV
Code: 14U4ZOC04

Hrs/Week: 4
Credits: 5

GENETICS

UNIT I: (12 Hours)

Introduction – Laws of Mendel- Monohybrid and Dihybrid Experiment. – Interaction of Genes (Epistatic gene, Complementary gene, & Lethal genes).

UNIT II: (12 Hours)

Mechanism of Linkage and crossing over – Types and theories –Significance of crossing over- Multiple alleles. Chromosomal mapping - Inheritance of Blood group in man and coat colour in Rabbit. Sex linked Inheritance (Haemophilia, colourblindness).

UNIT III: (12 Hours)

Sex determination in man, Drosophila and Bonellia – Mutations – Types of mutation and chromosomal aberrations and mutagens.

UNIT IV: (12 Hours)

Inbreeding and out breeding, heterosis- Hybrid Vigour – Genetic application in animals – DNA as genetic material – experiments – Human karyotype preparation and chromosomal syndrome in man (Down's syndrome, Turner's syndrome and Klinefelter's syndrome).

UNIT V: (12 Hours)

Haemoglobin disorders - Sickle cell anemia and thalassemia, Gene metabolic pathways, Inborn errors of metabolism in man. Eugenics- Genetic Engineering – Recombinant DNA Technology.

TEXT BOOKS:

1. Verma P.S. and Agarwal V.K. – Concepts of Genetics.
2. Rastogi V.B. A text book of Genetics, Kadarnath, Ramnath, Meerat.
3. Sambamurthy. AVSS - Genetics – Narosa Pub. House, New Delhi.
4. Watson, J.D., Baker, T.A., Bell, S.P., Gann, A., Levine, M and Losick, R., (2004) "Molecular Biology of the gene" Pearson education, Singapore Pvt., Ltd.,

B.Sc. BOTANY

Semester- IV
NMEC- II
Code: 14U4ZON02

Hrs/Week: 2
Credits: 2

APICULTURE

UNIT I: (6 Hours)

Honeybee – systematic position with reasons – species of Honeybees- Apiculture in India – Life history of Honeybee – Social behaviour – swarming – pheromone.

UNIT II: (6 Hours)

Bee colony – castes – natural colonies and their yield – Types of bee hives – structure – location, Care and management.

UNIT III: (6 Hours)

Apiary – Care and Management – Artificial bee hives – types – Instruments employed in Apiary – Extraction instruments.

UNIT IV: (6 Hours)

Honey – Composition – uses – Bee wax and its uses – yield in national and international market – Diseases of honey bees and their control methods.

UNIT V: (6 Hours)

Apiculture as self – employment venture preparing proposals for financial assistance and funding agencies – Economics of bee culture.

REFERENCE BOOKS:

1. Cherian R, & K.R. Ramanathan, 1992 – Bee keeping in India,
2. Mishra, R.C., 1985 – Honey bees and their Management in India, ICAR.
3. Singh, S.1982-Bee keeping – ICAR
4. Sharma, P. and Singh L. 1987 – Hand book of bee keeping, Chandigarh
5. Rare, S. 1998-Introduction. to bee keeping, Vikas publishing house.

AGRICULTURE ENTOMOLOGY

UNIT I: (6 Hours)

Introduction - Scope of agricultural Entomology-and its importance, Pest control measures- Mechanical, Cultural and Biological methods. IPM

UNIT II: (6 Hours)

Pest of crop - Rice stem borer- Systematic Position - Biology of the pest, Control measures. Gram and pod borer- Systematic Position - Biology of the pest, Control measures.

UNIT III: (6 Hours)

Pest of sugarcane - Stem borer in sugarcane- Systematic Position - Biology of the pest, Control measures. Spotted bollworm in cotton- Systematic Position - Biology of the pest, Control measures.

UNIT IV: (6 Hours)

Pest of oil seeds - Groundnut-Aphids- Systematic Position - Biology of the pest, Control measures. Gingelly- shoot borer and fruit borer- Systematic Position - Biology of the pest, Control measures.

UNIT V: (6 Hours)

Pest of stored products - Grannery weevil, Pulse beetle- Systematic Position - Biology of the pest, Control measures

REFERENCE BOOKS:

1. Vasantharaj David.B and Kumaraswami. T (1988) Elements of Economic Entomology.
2. Mani.M.S (1982) General Entomology, Oxford and IBH publishing Co.
3. Awasthi.V.B (2002) Introduction to general and applied Entomology, Scientific publishers (India) Jodhpur.
4. Nalinasunthari and R. Santhi (2006) Entomology, MJP publishers Chennai.

CELLBIOLOGY AND GENETICS

A. CELL BIOLOGY PRACTICALS (20 Marks)

1. Counting of RBC and / WBC Using haemocytometer
2. Differential count of WBC
3. Mounting Buccal Epithelium and observing living Cells using vital staining
4. Study of mitotic division using onion root tips

B. GENETICS PRACTICALS (10 Marks)

1. Observation of common mutants of *Drosophila*
2. Preparation of mounting of the salivary gland in chironomous larva/ *Drosophila* larva
3. Human blood grouping.

C. SPOTTERS (20 Marks)

1. Use of Microscopes
2. Camera Lucida
3. Stage and Ocular micrometers
4. Haemocytometer
5. *Chironomous* larva
6. *Drosophila* – Wings and Eye.
7. Electrophoresis Kit
8. Stages of Mitosis.

D. SUBMISSION OF PRACTICAL RECORDS. (10 Marks)

B.Sc. ZOOLOGY

Semester- V
Core Paper- V
Code: 14U5ZOC05

Hrs/Week: 5
Credits: 5

ANIMAL PHYSIOLOGY

UNIT: I

Digestion: Digestion of carbohydrates, proteins & lipids and absorption. **Metabolism: Carbohydrate**, lipid metabolism – Beta oxidations – **ketosis**; Protein metabolism – deamination – transamination.

UNIT: II

Respiration in man: Respiratory tract – Structure of hemoglobin – Transport of respiratory gases – Oxygen disassociation curve – Carbon-di-oxide transport – **Chloral shift** - Hb as a buffer. Circulation: Composition of blood – Blood clotting – Heart beat – origin – conduction – **Cardiac cycle** – **Blood pressure, ECG.**

UNIT: III

Muscle contraction: **Types of muscles**, Ultra structure of Skeletal Muscle, **Theories of Muscle contraction, Muscle Proteins - Neurons – Structure and types.** Neural conduction: Resting potential – conduction of nerve impulse – synaptic transmission – neuromuscular junction – reflexes. **Sense organs – Eye and Ear.**

UNIT: IV

Osmoregulation – ionic regulation of fresh water fish; Thermoregulation – regulation of body temperature in animal. Endocrine glands: Structure and functions of **Adrenal Glands, Hypothalamus, Ovaries, Pancreas, Parathyroid, Pineal Gland, Pituitary Gland, Testes, Thymus, Thyroid and Islets of langerhans.**

UNIT: V

Excretion: **Nephron – Structure and Function, Formation of urine.** Nitrogenous waste products – ammonia - urea – uric acid. Reproduction: Anatomy of reproductive organs in human – reproductive cycles – hormone control of reproduction.

Text book:

1. Singh, H. R. (2006) Animal Physiology and Related biochemistry. S. Chand & Co., Publishers, New Delhi.
2. Berry, A.K. (2004) A text book of Animal physiology, Jagdamba offset press, New Delhi.

REFERENCE BOOKS:

1. Moyes, C.D. and Schulte, P. M. (2006) Principles of Animal Physiology, Pearson Education Inc., Chennai.
2. Tortora, G. J. and Derrickson, B. (2006) Principles of Anatomy and Physiology, 11th edition, John Wiley and Sons Inc., USA.
3. Richard W. Hill, Gordon A. Wyse (2004) Animal Physiology, Second Edition, Sinauer Associate, Inc Publishers, USA.
4. Guyton, A.C. (2001) Text book of Medical Physiology, 10th edition W. B. Saunders Company, Philadelphia.

B.Sc. ZOOLOGY

Semester- V
Core Paper- VI
Code: 14U5ZOC06

Hrs/Week: 5
Credits: 5

DEVELOPMENTAL BIOLOGY

UNIT: I

Gametogenesis – Definition spermatogenesis sperm structure, sperm motility. Oogenesis, Ultra structural organization of the egg.

UNIT: II

Fertilization – Definition, Types, mechanism of fertilization – significance Parthenogenesis. **Fate map (frog).**

UNIT: III

Cleavage – Definition, salient features, types and patterns of cleavage. Blastulation – Types of Blastula. **Gastrulation – Definition, patterns and physiology of gastrulation (Amphioxus and chick).**

UNIT: IV

Placenta – Structure and types. Differentiation; Organogenesis-Development of eye, heart and brain.

UNIT: V

Metamorphosis – Definition, Types, and Physiological changes associated with metamorphosis Hormonal control of amphibian metamorphosis – Neuro endocrine control of insect metamorphosis. Regeneration.

Text Books:

1. Verma, P.S. and Agarwal, V.K. (2009) Chordata Embryology, S. Chand & Company Ltd., New Delhi.
2. Arumugam, N. (2009) A Text book of Embryology (Developmental Biology), Saras Publication, Kanyakumari.
3. Khanna, D.R. (2009) Embryology, Sonali Publications, New Delhi.

REFERENCE BOOKS:

1. Lewis Wolpert (2007) Principles of Development (III edition) Oxford University Press, UK.
2. Gilbert, F.S. (2006) Developmental Biology, 8th edition, Sinauer Associates, Inc. Publishers, Massachusetts.
3. Balinsky, B.I. (2004) An Introduction to Embryology, 5th edition, Thomas Asia Pvt. Ltd, Chennai.
4. Gilbert, F.S. (2003) Developmental Biology, 7th Edition, Sinauer Associates, Inc. Publishers, Massachusetts.

B.Sc. ZOOLOGY

Semester- V

Core Paper- VII

Code: 14U5ZOC07

Hrs/Week: 5

Credits: 5

MICROBIOLOGY AND IMMUNOLOGY

UNIT: I INTRODUCTION AND CLASSIFICATION

Historical background- scope- Contribution of Louis Pasteur, Robert Koch, Alexander Fleming- Outline classification of microbes – Whittaker's five kingdom concept – Protist, Prokaryotes, Eukaryotes. Basic structure and salient features of – Virus, Bacteria, Fungi. Gram staining: Gram negative, Positive bacteria.

UNIT: II MICROBES AND DISEASES

Microbial disease of man (Causative agents) Bacterial disease – Diphtheria, TB, Typhoid. Viral disease – Influenza, chicken pox, Hepatitis, AIDS. Fungal disease - Aspergillosis, Candidiasis

UNIT: III MICROBIAL CULTURE

Disinfection – Types of sterilization. Medium preparation – Types of media; Nutritional requirements; Culture of bacteria – Methods: Types of bacterial culture, Maintenance of pure culture, Bacterial growth curve. Culture techniques – handling methods.

UNIT: IV

Cells involved in the immune system, Innate immunity- factors involved in innate immunity, active and passive acquired immunity. Lymphoid organs: Thymus, Bursa of Fabricius and bone marrow, lymph node, spleen.

UNIT: V

General structure and functions of different types of human immunoglobulins - IgA, IgG, IgD, IgE, and IgM. Antigen- antibodies reaction – Classical and Alternative pathways.

TEXT BOOKS:

1. Ananthanarayan, R., and Jayaram Paniker, C.K. (2006) Text book of Microbiology, Orient Longman Ltd., New Delhi.
2. Purohit, S.S. (2006) Microbiology, V Edition, Agrobios (India) Publishers, Jodhpur.

REFERENCE BOOKS:

1. Kamal, G.P. Rao and D.R. Modi (2005) Concepts of Microbiology, International Book Distributing Co., Lucknow.
2. Dubay, R. C. and Maheshwari D. K. (2005) Text Book of Microbiology, S. Chand & Co. Ltd., New Delhi.
3. Prescott, L.M., Harley, J.P. and Ulein, B.A. (2004) Microbiology (IV Ed). WMC, Brown Publisher, USA.
4. Pelczar, M.J. (2002) Microbiology, McGraw-Hill Education India Ltd., New Delhi.

B.Sc. ZOOLOGY

Semester- V
Elective- I
Code: 14U5ZOE01

Hrs/Week: 5
Credits: 5

BIOTECHNOLOGY

UNIT: I

Biotechnology: Definition, scope and importance –Agriculture, Animal Husbandry and medicine.

UNIT: II

Genetic engineering – Gene cloning; Methods involved – Tools of genetic engineering; PCR, Gene library and Gene bank. Transgenesis – Cow and Goat - Electrophoration and gene gun method.

UNIT: III

Genetic manipulation of Eukaryotes: Gene transfer methods in yeast, animal cells – Applications.

UNIT: IV

Industrial Biotechnology: Principle of fermentation – process of fermentation, upstream and downstream processing – methods of fermentation, industrially used micro organisms, Uses of micro organisms in agriculture, Nitrogen fixation,

UNIT: V

Enzyme Biotechnology: Enzyme - source – production in large scale – Extraction of enzyme, Purification of enzyme – immobilization of enzyme and advantages – Applications of enzymes. Outline of stem cells – types – generation of adult stem cells and its applications.

TEXT BOOKS:

1. Satyanarayana, U. (2010) Biotechnology, Books and Allied (P) Limited, Kolkata.
2. Dubey, R.C. (2009) Text Book of Biotechnology. S. Chand and Company Ltd, New Delhi.

REFERENCES BOOKS:

1. Kumar, H.D. (2008) Modern concepts of Biotechnology, Vikas Publishing House Pvt Ltd., New Delhi.
2. Sasidhara, R. (2006) Animal Biotechnology, MJP Publishers, Chennai.
3. Dubey, R.C. (2006) A textbook of Biotechnology, S. Chand Company Ltd, New Delhi.
4. Pradeep Parihar, (2004) A textbook of Biotechnology, Student Edition, Jodhpur.
5. Ranga, M.M. (2003) Animal Biotechnology, Agrobios Publishers, India,
6. Primrose, S.B. (2000) Modern Biotechnology, Blackwell Scientific Publication, Oxford, London.

B.Sc. ZOOLOGY

Semester- V
SBEC- III
Code: 14U5ZOS03

Hrs/Week: 2
Credits: 2

SERICULTURE

UNIT: I

Scope of mulberry sericulture; History of sericulture; Development of sericulture in India – Economic Importance.

UNIT: II

Moriculture: Mulberry varieties in Tamil Nadu; Methods of propagation, Suitable soil, irrigation, manuring, application of fertilizers. Pruning – mulching – Harvesting of leaves – preservation of leave. Disease and pests of mulberry.

UNIT: III

Races of silk worm ,Life cycle of *Bombyx mori* – Rearing house – Rearing appliances – Rearing methods; Seed production – rearing of young age silk worm – Rearing of late age of silkworm.

UNIT: IV

Disease and pests of silk worm – prevention and control measures; Mounting of silkworm for spinning cocoons; Harvesting and marketing of cocoons; Quality of cocoons.

UNIT: V

Reeling of Cocoons – process of reeling – stifling and storage – sorting and deflossing. Reeling equipments, [Field visit](#).

TEXT BOOKS:

1. Ganga, G.J. and Sulochana Chetty, J. (2010) An Introduction to Sericulture, II Edition, Oxford & IBH Publishing & Co Pvt. Ltd., London.
2. Dandin, S.B. (2004) Hand Book of New sericulture technologies, Central Silk Board, Bangalore.
3. Srinivas, P. and Madan Mohan (2001) Mulberry cultivation, SIVE, DIE, Hyderabad.

REFERENCE BOOKS:

1. Prakash Malhotra (2008) Economic Zoology, Adhyayna Publishers & Distributors, New Delhi.
2. Patnaik, R.K. (2008) A Text Book of Mulberry Cultivation, Biotech Book Publishers, New Delhi.
3. Jabde and Pradip, V. (2005) Text Book of Applied Zoology, Discovery Publishing House, New Delhi.
4. Arumugam, N., Murugan, S., Johnson Rajeshwar, J, and Ram Prabhu, R. (2005) Applied Zoology, Saras Publication, Kanyakumari.

B.Sc. ZOOLOGY

Semester- V
SBEC- IV
Code: 14U5ZOS04

Hrs/Week: 2
Credits: 2

VERMI TECHNOLOGY

UNIT: I ECOLOGICAL TYPES

Trophic Classification of Earth worms – epigeic – anecic – endogeic – Drilosphere – Biological Effects of Earthworms on the soil.

UNIT: II STRUCTURE AND LIFE CYCLE

Morphology and Life cycle of *Lampito mauritii*, *Megacolex mauritii* (Cocoons, Juveniles, Non-Clitellates, Clitellates). Life Cycle of *Preionyx Excavatus* (Cocoons, Juveniles, Non-Clitellates, Clitellates).

UNIT: III CULTURE TECHNIQUES

Worms for Vermiculture, Earthworm Breeding, Role of Earthworms – In sustainable agriculture, Soil properties, Organic Farming.

UNIT: IV VERMICULTURE AND VERMITECH

Vermiculture – Preparation of Vermibeds, Setting up of a Vermiwash Unit – Economics of Vermitech

UNIT: V VERMICOMPOSTING, USES, POTENTIAL AND AGRICULTURE

Recycling of wastes through Vermicomposting; Earthworms in Medicine; Application in organic agriculture.

TEXT BOOKS:

1. Prakash Malhotra (2008) Economic Zoology, Adhyayna Publishers & Distributors, New Delhi.
2. NIIR Board (2006) The Complete Technology Book on Vermiculture and Vermicompost, NIIR, New Delhi.
3. Sultan Ahmed Ismail (2005) The Earthworm, Others India Press, Goa, India.

REFERENCE BOOKS:

1. Cliveta Edwards (2010) Vermiculture Technology, CRC Press, USA.
2. Kotpal, R.L. (2009) Modern text Book of Invertebrates: Zoology. Rajhans Publishers, New Delhi.
3. Bhattacharya, P., Kumar, D., Bihari, K. Pandey, V., Gehlot, D. and Paliwal, M.K. (2003) Vermiculture technology, National Biofertilizer Development Centre, Ghaziabad.
4. Bhatnagar, R.K. and Palta, R.K. (1996) Earthworm: Vermiculture and Vermicomposting, Kalyani Publishers, New Delhi, India.
5. Edwards, C.A. and Loft, J.R. (1977) Biology of Earthworms, 3rd Edition, Chapman Publications, London.

B.Sc. ZOOLOGY

Semester- VI

Hrs/Week: 5

Core Paper- VIII
Code: 14U6ZOC08

Credits: 5

EVOLUTION

UNIT: I

History and origin of life, Abiogenesis, Biogenesis, cosmozoic theory, Biochemical origin of life, Coacervates, and Microspheres, **Theories of organic evolution**, Urey and Miller,s Experiment. **Types of evolution.**

UNIT: II

Evidences - Paleontology, comparative anatomy, Embryology, Physiology & Bio Chemistry. **Geological time scale.**

UNIT: III

Lamarckism and Neo-Lamarckism – Darwinism and Neo Darwinism. **Modern synthetic theory of evolution.**

UNIT: IV

Natural selection, species & Speciation – **types of speciation – Geographical and Reproductive isolation, Role of isolation in Speciation**, Isolating mechanisms, Mutation and genetic drift. **Evolution of horse and man. Hardy Weinberg law, prospects for the control of human evolution.**

UNIT: V

Adaptation and Evolution – Mimicry, Colouration of animal, non- adaptive characters, **Adaptive radiation in Mammals** – Evolutionary significance

TEXT BOOKS:

1. Arumugam. N (2009) A text book of Organic Evolution, Saras Publication, Kanyakumari.
2. Rastogi, V.B. (2007) Organic Evolution, Kedarnath, Ramnath publishers, Meerut.
3. Verma, P.S. and Agarwal, V.L. (2005) Concepts of Evolution S. Chand & Company, New Delhi.

REFERENCE BOOKS:

1. Sanjib Chattopadhyay (2012) Life –Evolution, Adaptation & Ethology, Books and Allied (P) Ltd, KolKatta.
2. Richa Arora (2009) Patterns of Evolution, Anmol Publishers, New Delhi.
3. Richa Arora (2004) Elements of Organic Evolution, Anmol Publication Pvt. Ltd., New Delhi.
4. Rastogi, V.B. (2003) Organic Evolution, Kedarnath Ramnath Publishers, Meerut.
5. Strickberger, M.W. (2000) Evolution. Jones & Bartlett Publications, New Delhi.
6. Dodson, E.O. (1985) Evolution: Process & Product, Prindle, New Delhi.

B.Sc. ZOOLOGY

Semester- VI
Core Paper- IX
Code: 14U6ZOC09

Hrs/Week: 5
Credits: 5

ECOLOGY

UNIT: I

Scope – Branches of Ecology – Abiotic factors – Water, Light, Temperature and Soil, **Biogeochemical cycle (Carbon and Nitrogen cycle)**, Biotic factors – Animal relationships – Symbiosis, Commensalisms, Mutualism, Parasitism and Competition – intra specific and inter specific competition.

UNIT: II

Ecosystem – Types, Fresh water ecosystem – Pond – types of Food chain – Food web – Trophic levels – Concepts of Ecological niche - Energy flow – Ecological pyramids – Pyramid of Biomass, Number and Energy. Intertidal fauna – Rocky, Sandy and Muddy shore fauna **and their adaptations – Adaptations of desert animals.**

UNIT: III

Population–definition – Natality, Mortality, population fluctuation, dispersal, Age pyramid, Ecological succession. **Growth curve.**

UNIT: IV

Biodiversity – Types – Loss of biodiversity – threat to biodiversity – Conservation of Biodiversity. Mega diversity with reference to India.

UNIT: V

Pollution – types (Air, Water, Soil, Radioactive, Plastic) Biological effects and control - Environmental Impact Assessment (EIA).

TEXT BOOKS:

1. Arumugam, N. (2009) Ecology, Saras Publication, Kanyakumari.
2. Sharma, P.D. (1990) Ecology and Environment, Rastogi Publications, Meerut.

REFERENCE BOOKS

1. Gowrikrishna Dasmohapatra (2009) Environment and Ecology (III Edn) VIKAS Publishing House Pvt Ltd, New Delhi.
2. Ahluswalia, V.K. and Sunita Malhotra (2009) Environmental Sciences, Ane Books Pvt Ltd, New Delhi.
3. Kormondy, E.J. (2007) Concepts of Ecology, Frenice Hall of India, New Delhi
4. Odum, E.P. (2003) Fundamentals of Ecology, Holt Saunders, Philadelphia.

B.Sc. ZOOLOGY

Semester- VI
Elective- II
Code- 14U6ZOE02

Hrs/Week: 5
Credits: 5

BIOCHEMISTRY

UNIT I

Carbohydrates - Classification, Biological importance of monosaccharide (glucose, fructose, galactose and xylose), disaccharides (sucrose and lactose), polysaccharides (glycogen, starch and chitin).

UNIT II

Lipids - Classification, structure, function and properties of simple, compound, complex, essential fatty acid and cholesterol.

UNIT III

Proteins– Classification, Essential and Non-essential amino acids. Proteins- Classification based on structure and functions. **Structural organization of proteins (Primary, secondary, tertiary and quaternary structures) – Ramachandran plot. Vitamins – Classification and functions.**

UNIT IV

Nucleic Acids – Structure, composition of purines and pyrimidines. DNA-Double helix, denaturation & renaturation. RNA – types (mRNA, tRNA, rRNA and hnRNA).

UNIT V

Enzymes- Definition, classification, active site, lock and key model, induced fit hypothesis, enzyme kinetics (MM & LB plot), **factors affecting enzyme activity**

Text Book:

1. Satyanarayana, U and Chakrapani, U (2009) Essentials of Biochemistry, Books and Allied (P) Limited, Kolkata.
2. Vasudevan, D.M and Sreekumar, S. (2003) Text Book of Biochemistry, Jaypee Brothers Medical publishers (P) Ltd, New Delhi.

Reference Books:

1. Satyanarayana, U (2005) f Biochemistry, Books and Allied (P) Limited, Kolkata.
2. Deb, A.C (2012) Concepts of Biochemistry, books and allied (P) Ltd. Kolkata.
3. Jain, J.L., (2005) Fundamentals of Biochemistry, S.Chand & Co Ltd.
4. Chatterjee, M.N (2008) Text book of Medical Biochemistry by 6th edition Jaypee brothers medical publishers (P) Ltd. New Delhi.

B.Sc. ZOOLOGY

Semester- VI
Elective- III
Code- 14U6ZOE03

Hrs/Week: 5
Credits: 5

MEDICAL LABORATORY TECHNIQUES

UNIT: I

Introduction – First aid treatments, collection of specimens and preservation - records and report preparation and maintenance – maintenance of glassware – sterilizations - Disposal of specimen – **safety precautions in the laboratory** –

UNIT: II

Light microscope: parts and working – Centrifuge – Colorimeter – Haemocytometer.
Biochemical tests of cholesterol, **bilirubin**, protein and sugars.

UNIT: III

Blood: Collection of blood (Venous and Capillary) – Total RBC count – Total leucocytes count - differential count – Haemoglobin estimation (Sahlis methods) ESR (Wintrobe and Westgren methods) – Bleeding and clotting time – Blood grouping and cross matching (Slide and Tube methods)

UNIT: IV

Urine: Collection, preservation – Biochemical test of protein – glucose– bile salts. Faeces: Microscopical examination of faeces.

UNIT: V

Sputum: Collection – microscopical and naked eye inspection – clinical examination.
Sperm: Collection of semen – microscopic examination – smear and count- **Pregnancy tests: Gravindex test** .

TEXT BOOKS:

1. Rajan, S. (2012) Manual for medical laboratory technology, Anjanaa Book House, Chennai.
2. Sood and Ramnik (2009) Medical Laboratory Techniques, Jaypee Brothers, New Delhi.
3. Kanai L. Mukherjee and Swarajit Ghosh (2009) Medical Laboratory Techniques, Tata Mc Graw Hill Publishing Company Ltd., New Delhi.

REFERENCE BOOKS:

1. B. S. Chauhan (2009) Principles of Biochemistry and Biophysics, first edition, Luxmi publishers, New Delhi.
2. Garrod, L.P. (2008) Medical Laboratory Techniques, BMJ publishers, USA.
3. Estridge, B.H., Reynolds, A.P. and Walters N.J. (2007) Basic Clinical Laboratory Techniques, Cengage Learning, Hyderabad.

B.Sc. ZOOLOGY

Semester- VI
SBCE -V
Code- 14U6ZOS05

Hrs/Week: 2
Credits: 2

POULTRY SCIENCE

UNIT: I

Poultry industry in India – Poultry breeds and classes of fowls – Poultry housing – general principles of building poultry house.

UNIT: II

Rearing of fowls – methods of rearing chicks, growers. Layers and broilers – growth management – summer and winter management.

UNIT: III

Poultry nutrition – composition of feeds - **Composition of poultry feed** – nutrient requirements for fowls – nutritional deficiency symptoms.

UNIT: IV

Poultry diseases: Ranikhet disease, New castle disease, Fowl pox, Birds flu. Vaccination schedules.

UNIT: V Poultry egg production – composition and nutritive value of egg - use of feathers and poultry manure. Economics of poultry. **Field visit.**

TEXT BOOKS:

1. Arumugam, N., Murugan, S., Johnson Rajeshwar, J. and Ram Prabhu, R. (2005) Applied Zoology, Saras Publication, Kanyakumari.
2. Prakash Malhotra (2008) Economic Zoology, Adhyayna Publishers & Distributors, New Delhi.

REFERENCE BOOKS:

1. Isabel Guerrero and Legarreta (2010) Hand Book of Poultry Science and Technology, John Wiley and Sons, New Jersey.
2. Jawaid, A. and Sinha, S. P. (2008) A Handbook of Economic Zoology. S. Chand & Company, New Delhi.
3. Khan, A. A. (2007) Encyclopedia of Economic Zoology. 2 vols. Anmol Publications Pvt. Ltd., New Delhi.
4. Upadhyaya, V.B. (2006) Economic Zoology. Rastogi Publications, Meerut, India.
5. Jabde and Pradip V (2005) Text Book of Applied Zoology, Discovery Publishing House, New Delhi.
6. Scott, M.L., Nesheim, M.C. and Young, R.J. (1982) Nutrition of the Chicken. 3rd ed. Ithaca, New York.
7. Biester, H.E. and Schwarte, L.H. (1969) Diseases of Poultry, 5th Edn. Oxford and IBH Publishing Co, New Delhi.

B.Sc. ZOOLOGY

Semester- VI
SBCE -VI
Code- 14U6ZOS06

Hrs/Week: 2
Credits: 2

AQUACULTURE

Unit I

Present status and Scope of Fisheries in India – Commercially important Fishes – Food and feeding habits of important edible fishes – Age and Growth: Method of determination

Unit II

Aquaculture types – Farm types – Site Selection and Construction of Farm maintenance and management – Eradication of algal Blooming and predators – Water Quality Management in culture ponds – Natural and supplement feed – Formulated feed for Fishes and Prawn

Unit III

Induced breeding – Hypophysation – Factors of Induced spawning – transport of fish feed – Fish Diseases and Control methods

Unit IV

Culture of Fresh water Prawn *Macrobrachium* – Marine Prawn *Penaeus* – Pearl Oyster – Green Mussel culture – Mono sex and poly sex culture – Integrated fish farming

Unit V

Fishing – Grafts and gears – Fish harvesting – Traditional and Modern Method – Eco sounding method – Electric Fishing – Fish preservation – Drying, salting, smoking, canning and refrigeration – Economics and Marketing of fishes

TEXT BOOKS:

1. Pillay T.V.R and Kutty M.N., (2005) Aquaculture: Principles and Practices, John Wiley & Sons
2. Pandey, B.N. and Sadhana, D. (2007) Aquaculture Principles and Practices, S.B. Nangia A.P.H Publishing Corporation, New Delhi.
3. Arumugam, N., Murugan, S., Johnson Rajeshwar, J. and Ram Prabhu, R. (2005) Applied Zoology, Saras Publication, Kanyakumari.
4. Shanmugam, K. (1992) Fishery Biology and Aquaculture, Leo Pathippagam, Chennai.
5. Santhanam, R. (1990) Fisheries Science, Daya Publishing House, New Delhi

REFERENCE BOOKS:

1. Kamaleswar Pandey and Shukla, J.P. (2005) Fish and Fisheries, Rastogi Publications, Meerut.
2. Yadav, M (2003) Economic Zoology, Discovery Publishing House, Rastogi Publications, Meerut.
3. Agarwal, S.C. (1994) A hand book of fish farming, Narendra Publishing House, New Delhi.
4. Chakrabarthi, M.N. (1998) Biology, Culture and Production of Indian major carps, Narendra Publishing House, New Delhi.
5. Hall, C.B. (1999) Ponds and fish culture, Agro botanical Publishers, India.
6. Fresh water Aquaculture Rath R.K., 2000. Laurier Books Ltd.

B.Sc. ZOOLOGY

Semester- VI
Core Practical-III
Code- 14U6ZOCP03

Hrs/Week: 3
Credits: 5

ANIMAL PHYSIOLOGY, DEVELOPMENTAL BIOLOGY AND MICROBIOLOGY

Animal physiology:

1. Effect of temperature on salivary amylase activity
2. Qualitative analysis of excretory products
3. Rate of salt loss and salt gain in fish
4. Estimation of oxygen consumption in fish.
5. Estimation of hemoglobin. (Determination of anemic condition of the blood samples).
6. Qualitative analysis of carbohydrates, Protein and Lipid.

Developmental Biology:

1. Mounting of Chick embryo.
2. Various stages of chick embryo (Permanent slide identification)

Microbiology:

1. Culture techniques – Streak plate, Pour plate.
2. Media preparation

Spotters:

1. Haemoglobinometer.
2. Haemocyto meter
3. Kymograph
4. Spigmomanometer
5. Yolk plug stage
6. Blastula
7. Gastrula
8. Placenta
9. Inoculation loop
10. Autoclave
11. Laminar air flow
12. Chemosterilants (Chemicals)
13. Human egg
14. Human sperm

ECOLOGY AND EVOLUTION

Ecology and Evolution:

1. Estimation of dissolved oxygen content in given water sample (Winkler's Method).
2. Estimation of salinity in the given water sample.
3. Estimation of P^H in given water sample.
4. Study of gut content analysis of food and feeding habits.
5. Examination of intertidal fauna of rocky shore sandy shore and muddy shore.
6. Total counting of planktons in a given sample ; Mounting of plankton (any two).
7. Evolution of man
8. Tour report

Spotters:

1. Any two marine planktons
2. Sea anemone on hermit crab.
3. Plankton net.
4. Mysis
5. Daphnia
6. Cyclops
7. Cypris
8. Nauplius Larva
9. Use of Rain gauge
10. Maximum and Minimum thermometer
11. Aneroid Barometer
12. Any five fossils
13. Any 5 Endangered species