PERIYAR UNIVERSITY

PERIYAR PALKALAI NAGAR

SALEM – 636011

DEGREE OF BACHELOR OF SCIENCE

CHOICE BASED CREDIT SYSTEM

Syllabus for

B.SC. ZOOLOGY

(SEMESTER PATTERN)

(For Candidates admitted in the Colleges affiliated to Periyar University from 2017-2018 onwards)

DEFINITION

PROGRAMME:

"Programme" means core degrees offered in various disciplines.

COURSE:

"Course" refers to the courses offered under the degree programme spread over the complete Programme of study as under.

Part I		-	means "Tamil/other languages" offered under the programme.
Part II		-	means "English" language offered under the programme.
Part III		-	means "the core subjects" related to the programme concerned including Practicals.
Part III Allied		-	means "Allied subjects" offered as allied, which is interdisciplinary in nature but related to the programme.
Part III Electives		-	means "Elective subjects" related to the core subjects of the programme concerned.
Part IV	**(i)**	-	"Tamil" means basic orientation in Tamil language for those students who have not studied Tamil upto 12th standard.
	(ii)	-	"Advanced Tamil" means, the subject is meant for students who have studied Tamil language upto 12th standard and chosen other languages in college but would like to advance their Tamil language skills.
	(iii)	-	"Non-Major Electives" means option is being given to students who do not come under the above two categories (i & ii).
	(iv)	-	Skill based subject means the courses offered under the programme related to Advanced Skill acquisition for industrial application for which a separate Diploma will be awarded along with the Degree.
	(iv)	-	"Foundation Course" means courses offered as 1) Environmental Studies (1st year) 2) Value Education - Human Rights /Women's Rights (2nd year)
Part V		-	"Extension Activities" means all those activities which form part of NSS/NCC/Sports/YRC and other co and extracurricular activities.

A detailed explanation of the above with relevant credits are given under "Scheme of Examination along with Distribution of Marks and Credits"

Duration:

Means the stipulated years of study to complete a programme as prescribed by the University time to time. Currently for the undergraduate programme the duration of study is THREE years. These regulations apply to the regular course of study in approved institutions of the University.

Credits:

Means the weightage given to each course of study (subjects) attributed by the experts of the Board of Studies concerned.

Credit System:

Means, the course of study under this pattern, where weightage of credits are spread over to different semesters during the period of study and the Cumulative Grade Point Average will be awarded based on the credits earned by the students. The following are the total credit points:

For Undergraduate Programme (Three years) : 140

AIM AND SCOPE OF THE COURSE:

1. To acquire knowledge in different areas of animal science.
2. The topics included in different units of different papers would enable the students to develop technical skills in Zoological and applied branches.
3. Skill based subjects like Poultry Science, Diary Science, Human health and hygiene, Sericulture, Apiculture, Aquaculture, Biotechnology and Clinical Nutrition have been included in order to provide opportunities in employment and research in Government and Private Organizations.
4. There is also scope for self employment for the students.
5. Practicals included in the syllabus will improve the skills of the students in Microscopy, Observations, Drawing and Laboratory techniques.

ELIGIBILITY FOR ADMISSION:

Candidate for admission to the first year of the degree of Bachelor of Science Course shall be required to have passed the Higher secondary examination (Academic or Vocational Stream) conducted by the Government of Tamil Nadu or an Examination accepted by the Syndicate, Subject to such conditions may be prescribed therefore shall be permitted to appear and qualify for B.Sc degree examination in Zoology.

DURATION OF THE COURSE:

The course for the degree of Bachelor of Science shall consist of three academic years divided in to six semesters. Each semester consists of 90 working days.

PASSING MINIMUM:

The candidate shall b e declared to have passed the examinations if he /she secures not less than 40 marks.

DISTRIBUTION OF MARKS:

THEORY

University examination = 75 marks

Internal assessment = 25 marks

INTERNAL ASSESSMENT STRUCTURE:

Test = 15 marks

Assignments = 05 marks

Attendance = 05 marks

Passing minimum for Internal Assessment = 10 rmarks

Passing minimum of r University examinations = 30 maks

PRACTICALS

University examinations = 60 marks

Internal Assessment = 40 marks

INTERNAL ASSESSMENT STRUCTURE:

Test = 15 marks

Observation record = 10 marks

Regularity in Practical = 15 marks

Passing minimum for internal assessment = 10 marks

Passing minimum for University examinations = 30 marks

CLASSIFICATION OF SUCCESSFUL CANDIDATES:

- Candidates who secure not less than 60 % of the aggregate marks in the whole examinations shall be declared to have passed the examinations in First class.
- Candidates who secure above 50 % and below 60 % shall be declared to have passed the examinations in Second class.
- Other successful candidates who secure below 50% shall be declared to have passed the examination in Third class.

COURSE OF THE STUDY AND SCHEME OF EXAMINATIONS

Part	Paper Code	Subject Title	Hours		Credits	University Examination		
			Theory	Practicals		Internal (25%)	External (75%)	Total
SEMESTER I								
I	Language	Tamil I	6	-	3	25	75	100
II	Language	English I	6	-	3	25	75	100
III	Core-I	Invertebrata-I	5	-	3	25	75	100
III	Core Practical-I	Invertebrata - Practical	-	3	-	-	-	-
III	Allied I	Chemistry / Botany	4	-	3	25	75	100
III	Allied Practical		-	3	-	-	-	-
IV	Value education	Yoga	2	-	2	25	75	100
SEMESTER II								
I	Language	Tamil II	6	-	3	25	75	100
II	Language	English II	6	-	3	25	75	100
III	Core-II	Invertebrata-II	5	-	3	25	75	100
III	Core Practical-I	Invertebrata - Practical	-	3	3	40	60	100
III	Allied II	Botany / Chemistry	4	-	4	25	75	100
III	Allied Practical - I		-	3	3	40	60	100
IV	EVS	Environmental studies	1	-	2	25	75	100
IV	SBEC-I	Sericulture	2	-	2	25	75	100

Part	Paper Code	Subject Title	Hours		Credits	University Examination		
			Theory	Practicals		Internal (25%)	External (75%)	Total
SEMESTER III								
I	Language	Tamil III	6	-	3	25	75	100
II	Language	English III	6	-	3	25	75	100
III	Core-III	Chordata	4	-	5	25	75	100
III	Core Practical-III	Cell Biology and Chordata	-	3	-	-	-	-
III	Allied III	Chemistry / Botany	4	-	3	25	75	100
III	Allied Practical		-	3	-	-	-	-
IV	SBEC- II	Aquaculture	2	-	2	25	75	100
IV	NMEC-I	Human health and hygiene	2	-	2	25	75	100
SEMESTER IV								
I	Language	Tamil IV	6	-	3	25	75	100
II	Language	English IV	6	-	3	25	75	100
III	Core-IV	Cell Biology	6	-	5	25	75	100
III	Core Practical-II	Cell Biology and Chordata	-	3	4	40	60	100
III	Allied IV	Botany	4	-	4	25	75	100
III	Allied Practical - II		-	3	3	40	60	100
IV	NMEC- II	Wild life management	2	-	2	25	75	100

Part	Paper Code	Subject Title	Hours		Credits	University Examination		
			Theory	Practicals		Internal (25%)	External (75%)	Total
SEMESTER V								
III	Core V	Genetics	5	-	5	25	75	100
III	Core VI	Animal Physiology	5	-	5	25	75	100
III	Elective I	Medical Laboretory Techniques	5	-	5	25	75	100
III	Elective II	Biostatistics and Computer Applications	5	-	5	25	75	100
III	SBEC III	Biotechnology	2	-	2	25	75	100
IV	SBEC IV	Poultry Science	2	-	2	25	75	100
SEMESTER VI								
III	Core VII	Developmental Biology	5	-	5	25	75	100
III	Core VIII	Ecology	5	-	5	25	75	100
III	Core IX	Evolution	5	-	3	25	75	100
III	Elective III	Clinical Nutrition	5	-	5	25	75	100
III	SBEC-V	VermiTechnology	2	-	2	25	75	100
IV	SBEC VI	Dairy Science	2	-	2	25	75	100
IV	Core Practical-III	Genetics and Animal Physiology	-	3	4	40	60	100
V		Core Practical-IV	-	3	4	40	60	100
		Extension activities	-	-	1	-	-	-
		TOTAL CREDITS			**140**			

B.Sc. ZOOLOGY

SEMESTER - I

CORE I – INVERTEBBRATA - I

UNIT I

A brief introduction and nomenclature - Level of Organization and Classification up to order level.

Phylum Protozoa: General characters- Classifications. Type study-Paramecium-Structure, Locomotion, Nutrition and Reproduction.

General Topic: Protozoan Diseases.

UNIT II

Phylum Porifera: General characters- Classification -Type study- Ascon- Cellular structure, Skeleton, Nutrition and Reproduction.

General Topic: Canal System in Sponges

UNIT III

Phylum Coelenterata: General characters- Classification- Type study- Aurelia- Structure and life history.

General Topic: Polymorphism in Coelenterates.

UNIT IV

Phylum Platyhelmenthes: General Characters- Classification- Type study- Liver fluke-Structure, Reproduction and Life History.

General Topic: Parasitic adaptation of Helminths.

UNIT V

Phylum Annelida: General characters and Classification - Type study- Earthworm- External morphology, Digestive system and reproduction.

General Topic: Excretion in Annelids.

REFERENCES:

1. Agarwal V.K (2000) Invertebrate Zoology- S.Chand Company.
2. Barnes R.D (1987) Invertebrate Zoology- Saunders College Publications. Barrington E.J (1981) Invertebrate Structure and Function. ELBS Editions. Ekambaranatha Iyer (1993) Manual of Zoology Volume I Invertebrata.
3. Kotpal R.L (2003) Modern text book of Zoology- Rostogi Publications, Meerut.

B.SC. ZOOLOGY

SEMESTER II

CORE II – INVERTEBBRATA - II

UNIT I

Phylum Arthropoda I: General characters and Classification-Type Study- Penaeus- External morphology, Appendages, Nervous system and reproduction.

General Topic: Larval form of Crustacea

UNIT II

Phylum Arthropoda II: Type study – Cockroach - External morphology**,** Digestive system, Nervous and Reproductive system.

General Topic: Mouth parts of Insects- Beneficial Insects.

UNIT III

Phylum Mollusca I: General characters and Classification - Type study- Freshwater mussel - External morphology, Digestive system and Reproductive system.

General Topic: Respiration in molluscs

UNIT IV

Phylum Mollusca II: General characters and Classification - Type study- Sepia - External morphology, Digestive system, Respiratory system and Sense organ.

General Topic: Economic importance of Molluscs

UNIT V

Phylum Echinodermata: General characters and Classification - Type study- Starfish (Asterias rubens) - External morphology, Water vascular system in Star Fish.

General Topic: Larval forms of Echinoderms.

REFERENCES

1. Agarwal V.K (2000) Invertebrate Zoology- S.Chand Company.
2. Barnes R.D (1987) Invertebrate Zoology- Saunders College Publications. Barrington E.J (1981) Invertebrate Structure and Function. ELBS Editions. Ekambaranatha Iyer (1993) Manual of Zoology Volume I Invertebrata.
3. Kotpal R.L (2003) Modern text book of Zoology- Rostogi Publications, Meerut.
4. Arumugam N (2009) A text book of Invertebrates – Saras Publication.

B.Sc. ZOOLOGY

SEMESTER I & II

CORE PRACTICAL I- INVERTEBRATA

I. Major Practicals:

Cockroach-Nervous, digestive, Reproductive system

Prawn-Nervous system

II. Minor Practicals:

Prawn –Appendeges

Mouth parts –Honey Bee, Mosquito, and Cockroach.

III. Spottors:

a) Classify and giving reations:
Entamoeba, Paramecium, Leucosolenia, Hyalonema, Aurelia, Obelia, Taenia, Ascaris, Earthworm, Nereis, Cockroach, Prawn, Freshwater mussel, Starfish,.

b) Draw Labelled Sketch:
T.S. of Taenia ,T.S .of Fasciola , Ephyra larva , Nauplius larva and Zoea larva.

c) Biological Significance:
Sponge –Gemmule, Spicules, Physalia, Leech, Limulus, Peripatus, Bipinnaria,.

d) Relate structure and function
Taenia –Scolex , Earthworm – Body setae, Nereis – Parapodium, Peneus –Petasma, Star fish –Tube feet.

Submission of Practical record

B.Sc. ZOOLOGY

SEMESTER II

SKILL BASED ELECTIVE COURSE (SBEC) I

SERICULTURE

UNIT I

Types of silk worms – Tasar, Muga, and Eri. Morphology and life cycle of silk worm (*Bombyx mori*).

UNIT II

Mulberry cultivation in India - Selection of land and cultivation of mulberry –Mulberry varietie Different methods of planting –Organic and in organic manure application.

UNIT III

Disinfection of rearing houses and appliances - Egg transportation and incubation –Egg handling – Hatching –Brushing –Silk worm rearing techniques.

UNIT IV

Pest and diseases of silk worm and preventive measures. Harvesting of cocoon and quality assessment.

UNIT V

Reeling methods – Reeling and Re-reeling –Silk examination , cleaning , lacing , bookmaking and grading of silk .

Field visit to silk worm rearing centre and reeling industry.

REFERENCES:

1. An Introduction to sericulture (IInd edition) G.Ganga and Sulochana chetty .
2. RANGASWAMY .G. (1987) .Manual on sericulture FAO, Vol –IV, Agriculture service bulletin ,CSB , Bangalore , India.
3. DANDAN .S .B. (2004) ,Hand book of new sericulture technologies ,Central Silk Board Bangalore, pp 287.

B.SC. ZOOLOGY

SEMESTER III

CORE III - CHORDATA

UNIT I

Introduction - Prochordates - General Characters and classification Type Study: Amphioxus- external characters, digestive, excretory and circulatory systems.

Class: Pisces, General characters and classification – Type Study: Scoliodon-External characters, Digestive, Respiratory, Circulatory and Urinogenital Systems.

General Topic: Migration of fishes.

UNIT II

Class : Amphibia :General characters and classification -Type Study : Frog –External characters, Digestive ,Respiratory, Circulatory, Girdles and Limbs, Urinogenital Systems.

General Topic: Parental care in Amphibians.

UNIT III

Class: Reptelia: General characters and classification - Type study –Calotes- External characters- Digestive, Respiratory, Circulatory and Urinogenital Systems.

General Topic: Identification of Poisonous and Non- Poisonous snakes and Extinct Reptiles.

UNIT IV

Class: Aves- General characters and classification - Type Study-Pigeon- External characters -Digestive, Respiratory, Circulatory and Urinogenital Systems.

General Topic: Flight adaptations in Birds and migration of birds.

NIT V

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

General Topic: Dentition in mammals.

REFERENCES:

1) Ekambaranatha Iyer (1993) Manual of Zoology Vol.II, Viswanathan (printers& publishers) Chennai.

2) Jordon, E.L & Verma, P.S. (2000) Chordate Zoology, S.Chand & Co, New Delhi.

3) Newman H.H., Chordata, McMilan publishers.

4) Arumugam N (2009) A text book of Chordates – Saras Publication.

B.Sc. ZOOLOGY

SEMESTER III

SKILL BASED ELECTIVE COURSE (SBEC) II

AQUACULTURE

UNIT I

Definition of aquaculture – Principles of site selection for fish farms, water, soil, types and other parameters.

UNIT II

Types of aquaculture - Monoculture, Poly culture, Integrated farming, Pond culture, Pen and Cage culture, Raft culture, Race way culture, Warm and cold water fish culture .

UNIT III

Criteria for selection of variety – Seed procurement and stocking management. Water quality management.

UNITIV

Nutritional requirements and formulation of artificial diets. Breedingand cultureof fresh water fishes – Catla, *Mrigala*, Rohu and Tilapia.

UNIT V

Mari culture – Culture of edible oyster, pearl oyster, mussels, clams, sea urchins, sea cucumbers

REFERENCES:

1. Fish and Fisheries in India, Jhingran,V.G., 1982, Hindustan Publishing Corporation ,NewDelhi Principles and practices of Pond Aquaculture, Annan, J.F, R.O.Smiterman and G. Tehebenoglous (Eds) ,1983 , Oregan State University , U.S.A.
2. Home Aquarium:aquatic gema and tropical fish ,1970, Makinos Japan Publications .

B.Sc. ZOOLOGY

SEMESTER III

NON MAJOR-1

HUMAN HEALTH AND HYGIENE

UNIT I

Introduction to food. Composition and nutritive value of Cereals (Rice, Wheat, Millets, Ragi, Pearl millet). Nutritional deficiency disease – Anaemia, Scurvy

Unit II

Composition and medical value of Ginger, Black pepper and Turmeric. Dental Care and eye care.

Unit III

Communicable diseases – Dengue fever, Malaria, A*moebiasis*, Viral fever and AIDS.

Unit IV

Non-communicable diseases – Stroke, Diabetes, Obesity and Cancer.

Unit V

Awareness on Diarrhea, Alcoholism, Smoking, Tobacco chewing, Ulcer and Jaundice.

B.Sc. ZOOLOGY

SEMESTER IV

CORE IV - CELL BIOLOGY

UNIT I

Introduction – Microscopes (Simple, Compound, Electron, Florescent) Cytological techniques –Fixation – Sectioning and staining.

UNIT II

Plasma membrane: Ultra structure – Chemical composition and functions and modifications of plasma membrane.

Endoplasmic reticulum: Morphology, Ultra structure, chemical composition and functions.

Golgi complex: Ultra structure, chemical composition and functions.

UNIT III

Lysosomes: Ultra structure and polymorphism- chemical composition and functions: Peroxisomes and glyoxysomes.

Mitochondria: Ultra structure- chemical composition-enzyme systems- functions-Oxidation-Respiratory chain (ETP)- Kreb's cycle, ATP Production and Biogenesis.

UNIT IV

Ribosomes: Ultra structure-types- chemical composition - functions.

Nucleus and Nucleolus: Ultra structure and functions.

Nucleic Acids: DNA –Ultra structure-replication-transcription, RNA-Types-Genetic code and protein synthesis.

UNIT V

Chromosomes: Ultra structure of Chromosomes, Special types of Chromosomes and functions, Cell division- mitosis and meiosis.

Cancer biology - Types of Cancer, Oncogenes, and Treatments.

REFERNCES:

1. Cell biology. Veer Bala Rastogi, Rastogi Publications.
2. Cell Biology, Power.
3. Arumugam N (2009) Cell biology – Saras Publication.

B.Sc. ZOOLOGY

SEMESTER III & IV

CORE PRACTICAL II

CELL BIOLOGY AND CHORDATA

I. Major Practical

Total Counting of RBC and/WBC.

Study of mitotic division in onion root tips.

II. Minor Practical

Blood Smear Preparation.

Buccal smear preparation.

Human blood grouping

IV. SPOTTERS

A) Classify and giving reasons:

Amphioxus, Balanoglossus, Shark, Hippocampus, Bufo, Hyla, Naja Naja (Cobra), Pigeon, Rabbit

B) Draw and Labeled Sketch:

Frog-Pectoral Girdle, Pelvic girdle and, Fore Limb, Hind Limb, Hyoid apparatus, Quill Feather, Carapace, Plastron and Draco

C) Biological Significance:

Balanoglossus, Petromyzon, Echeneis, Narcine, Ichthyophis, Axolotyl larva, Chameleon and Bat

D) Comment on dentition of the following

Skull of Rabbit and Dog

V. SUBMISSION OF PRACTICAL RECORD

B.Sc. ZOOLOGY

SEMESTER IV

NMEC II - WILDLIFE MANAGEMENT

UNIT I

Wildlife management – Definition and Aim – Himalayan mountain system – Peninsular region – Western Ghats.

UNIT II

Wildlife values and benefits – causes of wildlife depletion – Necessary for conservation – Mode of conservation.

UNIT III

Sanctuaries and National parks in India – Wildlife census.

UNIT IV

Indian endangered fauna, Special projects for endangered species (Tiger, Lion and Elephant).

UNIT V

Indian Board of wildlife (IBWL) – Biosphere – Nilgiri, Wildlife Protection act.

REFERENCES:

1. Veer Bala Rastogi and Jayaraj. Animal ecology and distribution of Animals. Kedarnath Ramnath , New Delhi.
2. Saharia V.B. Wildlife in India. Nataraj Publications, Dehradun 2009.
3. Verma P.S. & Agarwal V.K. Environmental Biology, Rastogi Publication, Meerut 2011.
4. Agarwal V.K. Simplified course in B.Sc., Zoology – Ecology and Ethology. 2002.

B.Sc. ZOOLOGY

SEMESTER V

CORE PAPER V - GENETICS

UNIT I

Introduction – **Mendalism** – Gene interaction (Complementary genes, Lethal genes and Epitasis. **Multiple alleles** - Blood group in man and Coat colour in Rabbit.

UNIT II

Linkage and crossing over –Types, theories and significance – Chromosomal Map.

Sex linked inheritance (Haemophilia, Colour blindness and Drosophila eye colour). Sex limited and sex influenced genes.

UNIT III

Sex determination in man and Drosophila, Chromosomal Theory and Gynandromophs

Mutations: Types, Chromosomal aberrations, Aneuploidy and Euploidy**.**

UNIT IV

Inbreeding and out breeding – significance, merits and demerits.

Syndromes (Down syndrome and Turners syndrome, Twins in man).

UNIT V

Human genome project – Pedigree analysis - Gene structure and functions – Genetic Engineering Recombinant DNA technology.

REFERENCES:

1. Verma P.S. and Agarwal V. K . –Concepts of Genetics.
2. Rastogi V.B. A text book of Genetics, K.Ramnath, Meerut.
3. Sambamurthy A. – Genetics – Narosa Pub, New Delhi**.**
4. Arumugam N (2009) Genetics – Saras Publication.

B.Sc. ZOOLOGY
SEMESTER V
CORE VI - ANIMAL PHYSIOLOGY

UNIT I

Nutrition – Food types, Vitamins and Minerals.

Enzymes – Classification, Mechanism of Enzyme action, Coenzymes, Digestion in man. **Respiration** – Respiratory pigments, transport of O_2 and CO_2 in man and Anaerobiosis.

UNIT II

Circulation - blood composition, origin and conduction of heart beat in man – blood pressure.

Excretion – Excretory products, Classification – structure of the mammalian kidney and urine formation.

UNIT III

Osmoregulation in Fishes, Osmoconfirmers, Osmoregulators.

Metabolism – Protein metabolism – Deamenation and Ornithine cycle, Carbohydrate – Glycogenesis, Glycolysis, Fat – β Oxidation.

UNIT IV

Nervous Coordination - Neuron, - Types – Conduction of nerve impulse - synaptic transmission – Neuro muscular junction - reflex action.

Effectors – Muscles - Types of muscles – ultra structure of skeletal muscle – Chemical composition and Physiology of Muscle contraction – Kymograph, actin and myosin.

UNIT V

Hormones – Endocrine glands Structure and functions : Pituitary, Thyroid, Islets of Langerhans, Adrenal, and Gonadial Hormone in man: Testis and Ovary.

REFERENCES:

1. Verma P.S. & Tyagi B.S. Animal Physiology, 6th edition. S.Chand & Co. Agarwal, V.K. Agarwal, R.A.Srivastava A.K. & Kausha Kumar, Animal physiology & Biochemistry, S. Chand & Co.,
2. Hoar, W.S (1987) General and Comparative physiology, prentice – Hall. M.K.Chanddrashekaran – Circadian Rhythms – Madras science foundation, Chennai.
3. Arumugam N (2009) Animal physiology – Saras Publication.

B.Sc. ZOOLOGY

ELECTIVE I

MEDICAL LABORATORY TECHNIQUES (MLT) I

UNIT I

General and personal care in the laboratory.

Laboratory instruments: Autoclave, hot air oven, incubators, water bath, Centrifuge, Refrigerator, Colorimeter, $_{P}$H meter, Heamoglobinometer.

UNIT II

Preparation and uses of reagents – normal saline - Turkey's fluid, Hayem's fluid, Leishamn's stain Wright stain, Carnoy's fluid and Bovin's fluid - Acetocalamine.

UNIT III

RBC, WBC, Total count and Erythrocyte Sedimentation rate (ESR), platelet count, clotting time, bleeding time.

Blood pressure apparatus, ECG,

UNIT IV

Examination of urine and faeces –microscopic examination of sediments. Methods of bacterial culture. Examination of cerebrospinal fluid, Semen analysis, sperm motility- sperm count and morphology.

UNIT V

Examination of parasites - Malarial parasites, Plasmodium, *Endameba histolytica*, *Ascaris lumbricoids*, *Taenia solium*.

REFERENCES:

1. Medical Laboratory Technology vol I, II, III –Kanai L. Mukherjee, Tata McGraw Hill Publishing Ltd., New Delhi.
2. Medical Laboratory Technology – Ramanik Sood – Jaypee Brother's Medical Publishers (P) Ltd., New Delhi.

B.Sc. ZOOLOGY

ELECTIVE II

BIOSTATISTICS AND COMPUTER APPLICATIONS

UNIT I

Introduction - Types of Data – primary and secondary – Collection and tabulation of data – diagrammatic and graphical representation – Bar diagram, Pi diagram, Column graph, Histogram.

UNIT II

Mean, Mode and Median, Standard deviation, Standard error and Coefficient of variance.

UNIT III

Simple Correlation, Simple Regression, Chi square test, student's – t- test, ANNOVA.

UNIT IV

Classification of Computers organization, Input devices, Central Processing Unit, output devices, Secondary storage devices, software.

UNIT V

Internet – Types, Applications and uses, WWW, E-Mail, Computer application in biology.

REFERENCES:

1. Introduction of Biostatistics and Computer Science – Y.I Parkar & M.G Dhanyagude NiraliPrakashan publishers, Pune.
2. Biostatistics by K.S. Negi ATIBS publications & distributiors, New Delhi.
3. Bishop O.N. Statistics for Biology. Boston, Hollghtan, Mifflin.
4. Introduction to Biostatistics by Pranab kumar, S.Chand company Ltd. New Delhi.

B.Sc. ZOOLOGY

SKILL BASED ELECTIVE COURSE (SBEC) III

BIOTECHNOLOGY

UNIT I

Scope of Biotechnology. Biotechnology in India, Methods of Genetic engineering.

UNIT II

Gene cloning, vectors - plasmid, Cosmids, Phage vectors –Lamda**.**

UNIT III

Enzymes for genetic engineering - Endonucleases – DNA ligases, alkaline phosphates**.**

UNIT IV

Polymerase Chain Reaction.(PCR), Blotting techniques (Southern)

UNIT V

Application of Biotechnology in Agriculture, Industries, Health**.**

REFERENCES:

1. Biotechnology by V. Kumarasan, Saras Publication.
2. R. C. Dubey (1998). A Text book of Biotechnology, S.Chand& co Ltd New Delhi.
3. S. Ignachi muthu (1995).Basic Biotechnology. Tata McGraw Hill publishing co Ltd, New Delhi.
4. Animal Biotechnology by Dr. Ramadas. Animal Biotechnology by Ranga.
5. Arumugam N (2009) Biotechnology – Saras Publication.

B.Sc. ZOOLOGY

SKILL BASED ELECTIVE COURSE (SBEC) IV

POULTRY SCIENCE

UNIT I

Introduction to poultry keeping – Poultry Industry in India – Important breeds of Poultry – Desi, – Chittagong and Leghorn.

UNIT II

Construction of poultry house – Types - Layer house and Broiler house

UNIT III

Poultry feeds – Essential nutrients – Ration for Chick and Broiler.

UNIT IV

Hatchery, Nutritional value of egg, Marketing of egg and By products of poultry.

UNIT V

Common diseases of poultry – Raniket, Coccidiosis and Coryza, Vaccination programme.

REFERENCES:

1. Modern aspects of commercial Poultry keeping. Gnanamani A.R. Giri Publication, Madurai.
2. A text book of Animal Husbandry – Banerjee G.C. Oxford & IBH publishing Co Pvt. Ltd., New Delhi. 8th Edition
3. Poultry keeping in India. Naidu P.M.N. Indian Council of Agricultural Research, New Delhi
4. Poultry production. Singh R.A. New Delhi

B.Sc. ZOOLOGY
SEMESTER VI
CORE VII
DEVELOPMENTAL BIOLOGY

UNIT I

Spermatogenesis – definition – Development and structure of mammalian sperm.

Oogenesis – definition – Mechanism and significance – Types of eggs and egg membranes. Fertilization – definition – process and significance.

UNIT II

Parthenogenesis – definition and significance – types of parthenogenesis.

Cleavage- Definition – Patterns –. Morula and Blastulation.

Cleavage in Frog, and Chick

UNIT III

Fate maps – Natural and Artificial Marking in eggs.

Gastrulation Definition and process in Frog and Chick. Exogastrulation.

UNIT IV

Organogenesis – Tubulation, Development of brain and eye in frog. \

Foetal membranes in chick,

Organizer, Placenta in mammals.

UNIT V

Metamorphosis – Definition and Significance. Hormonal control of metamorphosis in amphibians.

Regeneration – Definition, Types of Regeneration, Events in Regeneration, Physiological changes, Wolffian Regeneration

REFERENCES:

1. De Beer, G.R. Embryos and Ancestors. Clarenden Press, Oxford.
2. Verma. P.S and Agarwal, V.K. Chordate Embryology, S.Chand and Co. Ltd., New Delhi (1998). Bodmer, Modern Embryology, Saunders International student edition, Philadelphia.3rd Edition 1981.
3. Eli Benjamini et al., (1991) Immunology – A short course – Wiley Publishers, NY. Arumugam N (2009) A

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SEMESTER VI

CORE VIII – ECOLOGY

UNIT I

Man and the Environment - Limiting factors - Temperature, Light, Soil, Water sources and biological effects.

Biotic factors of the environment - Animal relationship.

UNIT II

Community Ecology: Population - characteristics – Density, Natality, Mortality and age distribution, Age pyramids.

Community - structure, stratification, components, Ecotone and edge effect, Ecological niche, Food chain and Food web.

UNIT III

Ecosystem - Pond as an ecosystem - Energy flow and ecological succession.

Biogeochemical cycle – Carbon, Nitrogen, Phosphorous. Animal relationship – Neutralism, Symbiosis and Antagonism.

UNIT IV

Habitats - Fresh water, Marine, estuary and Terrestrial. Environmental Pollutions - Air, Water, Soil and noise pollution, Sources and prevention. Solid waste management.

UNIT V

Natural resources- renewable and non renewable. Forest resources- Protection – Chipko movement- Aforestation. Wild life management- Biodiversity, Wild life sanctuaries and National Parks.

TEXT BOOKS

1. H.D.Kumar, Modern concepts of Ecology. Vikas Publishing house.
2. E.P. Odum, Fundamentals of Ecology.
3. G.C. Clarke, Elements of Ecology, John Wiley sons, New York
4. Arumugam N (2009) A text book of Ecology – Saras Publication

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SEMESTER VI

CORE IX - EVOLUTION

UNIT I

Introduction - Origin of life – Abiogenesis, Biogenesis, Time of origin, Urey and Miller Experiment.

UNIT II

Evidences from Paleontology - Comparative anatomy, Embryology, Physiology and Biochemical. Biogeography – Distribution of animals - Continuous and discontinuous distribution.

UNIT III

Lamarckism and Neo Lamarckism, Darwinism and Neo Darwinism. Modern synthetic theory, Salient features and principles.

UNIT IV

Natural selection Theory - Species and Speciation. Isolating mechanism, mutation and genetic drift.

UNIT V

Adaptation and adaptive radiation.

Colouration-mimicry-Darwin's finches.

Polymorphism -types and significance. Convergent - Divergent-parallel, evolution of Man.

REFERENCES:

1) Rostogi, V.B. Organic Evolution, Kedernath, Ramnath publishers, Meerut.

2) Verma P.S. & Agarval, V.L. concepts of evolution S.Chand & Company.

3) Introduction to evolution-Dodson-Evolution: process and product.

4) Arumugam N (2009) A text book of Evolution – Saras Publication

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SEMESTER VI

ELECTIVE III

CLINICAL NUTRITION

UNIT I

Introduction, Principles of Healthy Nutrition, Therapeutic diet – types and qualities.

UNIT II

Weight Management and Eating Disorders - Obesity and Underweight, causes and dietary management.

Nutrition and Anaemias

UNIT III

Diabetes - Types, Symptoms, Causes and dietary management.

Hypertension and Cardiovascular Diseases, Symptoms and Dietary management.

UNIT IV

Diseases of gastro Intestinal tract- Gastric and duodenal Ulcer, Diarrhea, Constipation and dietary management.

UNIT V

Typhoid, Jaundice, Malaria, dengue, *Chikungunya* – symptoms and dietary management.

REFERENCES:

1. Srilakshmi, B. Dietetics, New Age International (P).
2. Paul. S. Text book of Bionutrition curing diseases through diet. CBS Publications.

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SEMESTER VI

SKILL BASED ELECTIVE COURSE (SBEC-V)

VERMITECHNOLOGY

UNIT I

Earth worm classification – Morphology and anatomy. Biology of Lampito maruitii.

UNIT II

Vermicomposting materials and their classification –Feeding habits and food for composting worms .

UNIT III

Veermicomposting methods -Small scale and large scale pit methods, heap method, window method etc., Factors affecting vermicomposting such as Temperature, pH, moisture etc.,

UNIT IV

Vermicomposting in Homes, Maintenance of vermicomposting beds. Harvesting the worms. Earth worm predators, parasites and pathogens.

UNIT V

Application of vermicomposting in Agriculture and Horticultural practices. Advantages of vermicomposting.

REFERENCE:

1. Edwards C.A and Bater, B. 1996. Biology of Earth worms. Chapman and Hall. London. Ismail, S.A. 1997. Vermicology- The Biology of Earthworms. Orient Longman. India. Ranganathan L.S. 2006. Vermibiotechnology from soil health to human health. Agrobios India. Gupta P.K. 2008. Vermicomposting for sustainable agriculture. Agrobios. India.

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SEMESTER VI

SKILL BASED ELECTIVE COURSE (SBEC-VI)

DAIRY SCIENCE

UNIT I

Dairy farming – Definition – Scope – Role of Co-operative societies in milk production and marketing.

UNIT II

Dairy breeds of India and its classification – Exotic cow breeds – Jersy and Red sindhi. Indian breeds – Kangayam, Buffalo – Murrah.

UNIT III

Common cattle feed and their nutritive value – Balanced ration for cattle.

UNIT IV

Milk – Composition – Nutritive value and Pasteurization of milk. Milk products – Butter, Ghee, Cheese.

UNIT V

Bacterial diseases – Anthrax, Mastitis, Viral diseases – Foot and mouth disease, Non-contagious disease, Milk fever.

REFERENCES:

1. Ibraheem Kutty C. and Sheeba Khamer, Milk Production and processing. Daya publishing House, Delhi, 2014.
2. Banerjee G.C. A text book of Animal Husbandry Oxford & IBH publishing Co Pvt. Ltd., New Delhi. 8th Edition
3. The complete technology book on Dairy and Poultry industries with farming and processing. National Institute of Industrial Research Board, Delhi. 2012.
4. Hand book of Dairy farming to produce milk with packaging. EIRI

B.Sc. ZOOLOGY

SEMESTER VI

CORE PRACTICAL -III

GENETICS AND ANIMAL PHYSIOLOGY

I Major Practical:

Qualitative analysis of digestive enzymes in cockroach.

Estimation of the rate of O_2 consumption in fish/crab with reference to body weight.

Qualitative analysis of carbohydrates, proteins, and fats.

II Minor Practical:

Qualitative analysis of Ammonia, Urea and Uric acid in the given sample.

Study of human salivary activity in relation to temperature. \

Ciliary activity in fresh water mussels (Q10)

III Spotters

Observation of common mutants of drosophila

Monohybrid and Dihybrid and Test cross (Diagrammatic representation)

Kymograph – simple twitch, Trappe, Fatigue, Tetanus

Sphygmomanometer, pH meter, Colorimeter, Haemometer,

Submission of record.

B.Sc. ZOOLOGY

SEMESTER VI

CORE PRACTICAL IV

DEVELOPMENTAL BIOLOGY, ECOLOGY, EVALUATIONS, MLT, BIOSTATISTICS AND COMPUTER APPLICATIONS

MAJOR PRACTICALS:

Estimation of dissolved oxygen content in the given water sample (*Winkler Method*).

Estimation of salinity in given water sample.

Study of Marine/Freshwater Planktons

MINOR PRACTICALS:

Estimation of urine sugar.

Bleeding time.

Clotting time.

Calculation of Mean, median, mode for the given data.

Spotters:

Slides of different developmental stages of chick embryos (24, 48, 72, 96 hrs)

Slides of blastula and gastrula of frog (morula, early gastrula, yolk plug stage, late gastrula) Placenta of Sheep / Pig/ Rat.

Fossils any two

Description and uses of autoclave, Hot air oven, Incubator, Centrifuge, pH meter, Colori meter.

Computer applications - Hardware of computer, storage device, mouse.

Submission of Field Visit Report.

Submission of Practical Record.

B.Sc. ZOOLOGY

SEMESTER I

ALLIED ZOOLOGY

ALLIED PAPER I- INVERTEBATE & CHORDATE ZOOLOGY

UNIT I

Protozoa: Paramecium-structure and conjugation

Porifera: Leucosolenia- Structure

Coelenterata: Aurelia- Structure and its life history

General Topics: Protozoan Parasites- Plasmodium, Trypnasoma, Entomoeba

UNIT II

Platy helminthes: Fasciola hepatica- Structure and life cycle.

Annelida: Leech- Structure and Digestive system.

General Topic: Human Helminth Parasites- Taenia and wuchereria

UNIT III

Arthropoda: Cockroach - External Morphology and digestive system.

Mouth parts of Honey bee and Mosquito.

Mollusca: Fresh water mussel - External characters and Digestive system.

Echinodermata: Starfish –External characters.

General Topic: Water vascular system in Star fish.

UNIT IV

Chordata - Cephalochordata: Amphioxus - External characters and digestive system.

Pisces: Shark - External characters and digestive system .

Amphibia: Frog - External characters and respiratory system.

Reptilia: Calotes - external characters and urinogenetal system . General topic: Parental care in Amphibia .

UNIT V

Aves: Pigeon- External characters and respiratory system.

Mammalia: Rabbit – External characters and digestive system . General topic: Flight adaptation s of birds.

B.Sc. ZOOLOGY

SEMESTER II

ALLIED PAPER II - ZOOLOGY

UNIT I

Cell Biology: Structure of Animal cell -Structure and functions of Plasma membrane and Mitochondria .

Genetics: Mendelian laws of inheritance.

UNIT II

Developmental Biology: Types of eggs ,Cleavage Blastulation and Gastrulation in frog .

UNIT III

Physiology: Digestion and Excretion in man.

UNIT IV

Ecology: Pond as an Ecosystem, Animal association, Pollution (Air, Water & Noise.)

UNIT V

Evolution: Lamarckism and Neo - Lamarckism, Darwinism and Neo – Darwinism .

REFERENCES:

1. Bernice Anandtharaj - Allied Zoology.

B.Sc. ZOOLOGY

ALLIED ZOOLOGY - PRACTICAL I

MAJOR PRACTICALS

Cockroach –Digestive, Nervous and Reproductive systems.

MINOR PRACTICALS:

Mouth parts of Honey Bee.

Mouth parts of Mosquito.

SPOTTERS

Amoeba , Paramecium, Aurelia, Fasciola hepatica, Ephyra larva, Taenia Solium, Taenia Scolex, Fasciola-C.S, Ascaris - male and female.

Sea anemone Hermit crab, Star fish, Redia, Cercaria, Nauplius and Mysis larva.

Amphioxus, Shark, Cobra, Pigeon, Blastula of frog, 24hours Chick embryo.

Submission of Practical Record.

B.SC. DEGREE EXAMINATION

SEMESTER IV, OCTOBER-2017

ZOOLOGY

Cell Biology

Time: 3 hrs **Maximum: 75 marks**

Section-A (10x2=20)

Answer all questions

1. Active transport
2. Sarcoplasmic reticulum
3. Peroxisomes
4. Oxidative phosphorylation
5. Genetic codes
6. Satellite
7. Malignant tumour
8. Cell cycle
9. Microtomes
10. Cell fractionation

Section-B (5x5=25 marks)

Answer all questions

11. (a) Give an account on the types of Endoplasmic reticulum.

(Or)

(b) Discus the various functions of Golgi complex in the cells.

12. (a) Explain the structure of Mitochondria with a note on their function.

(Or)

(b) Give a detailed account of polymorphism in lysosomes.

12. (a) Describe the ultra structure of Nucleus.

(Or)

(b) Describe the Watson and Crick's structural model of DNA.

14. (a) Explain the structure and functions of chromosomes.

(Or)

(b) Breifly explain the events occur during mitosis.

15. (a) Briefly explain the fixation technique.

(Or)

(b) Give an account on tissue culture.

Section-C (3x10=30 marks)

Answer any THREE questions

16. Describe the Ultra structure and functions of plasma membrane,
17. Describe the ultra structure and functions of lysosomes.
18. Describe the role of ribosomes in protein synthesis,
19. Describe in detail the giant chromosomes.
20. Describe the different types of electrophoresis and their applications.

B.SC., DEGREE PRACTICAL EXAMINATIONS, MARCH - 2018

B.SC., ZOOLOGY, SEMESTER – IV

PRACTICAL - II, CELL BIOLOGY AND CHORDATA

Time: 3 Hrs **Max marks: 60**

1. Calculate/Demonstrate the required data with suitable experiment. Write the procedure and comment on your results. (20)
2. Using the given material to make a neat squash/slide preparation. (10)
3. Identify, Draw and comment on A, B, C and D (4x5=20)
4. Practical record (10)

Keys:

1. Total RBC counting
2. Squash preparation of Onion root tip
3. A. Amphioxus

   B. Draco

   C. Bat

   D. Skull of Rabbit