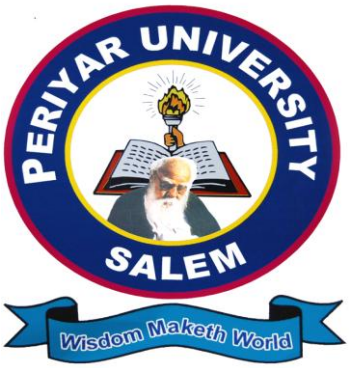
PERIYAR UNIVERSITY

PERIYAR PALKALAI NAGAR

SALEM – 636 011



DEGREE OF BACHELOR OF SCIENCE

CHOICE BASED CREDIT SYSTEM

SYLLABUS FOR B.SC ZOOLOGY BRANCH – VI

FOR THE STUDENTS ADMITTED FROM THE ACADEMIC YEAR 2012 – 2013 ONWARDS

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, Fish preservation, and Economic importance, Sericulture, Apiculture, Aquaculture, Biotechnology, Bioinformatics and Nutrition and Dietetics 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 the animals in the biosphere.

• 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 marks

Passing minimum of r University examinations = 30 marks

PRACTICALS

University examinations = 60 marks

Internal Assessment = 40 marks

Internal assessment structure:

Test = 15 marks

Assignment = 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 STUDY AND SCHEME OF EXAMINATIONS

Sem	Part	Course Code	Course (Subject)	Hours		Credits	Marks		
				Theory	Practical		CIA 25	EA 75	Total 100
I	I		Tamil I	6	---	3	25	75	100
	II		English I	6	---	3	25	75	100
	III	12UZO01	Core-I Invertebrata	5	----	5	25	75	100
			Core Practical	-----	3	----	--	--	--
			Allied theory Chemistry	4	---	3	25	75	100
			Allied Practical	---	3	--	--	--	--
	IV		Environ. Studies	1	--	--	--	--	--
			Value Edu	2	--	2	25	75	100
II	I		Tamil II	6	--	3	25	75	100
	II		English II	6	--	3	25	75	100
	III	12UZO02	Core-II Chordata	5	--	5	25	75	100
		12UZOP01	Core practical-I	--	3	3	40	60	100
			Allied theory Botany	4	--	4	25	75	100
			Allied Practical I	--	3	3	40	60	100

	IV		Env.Studies SBEC Ornamental Fisheries	1 2	-- --	2 2	25 25	75 75	100 100
		12UZOSB1	SBEC Ornamental Fisheries	2	--	2	25	75	100
		12UZONM1	NMEC Sericulture	2	--	2	25	75	100

Sem	Part	Course Code	Course (Subject)	Hours		Credits	Marks		
				Theory	Practical		CIA	EA	Total
III	I		Tamil III	6	--	3	25	75	100
	II		English III	6	--	3	25	75	100
	III	12UZO03	Core III Cell Biology	4	--	5	25	75	100
			Core Practical III	---	3	--	--	--	--
			Allied Theory Botany	4	--	3	25	75	100
			Allied practical	--	3	--	--	--	--
	IV	12UZOSB2	SBEC 2 Fish preservation	2	--	2	25	75	100

			and Economic Importance						
IV	I		Tamil IV	6	--	3	25	75	100
	II		English IV	6	--	3	25	75	100
	III	12UZO04	Core IV Genetics	6	--	5	25	75	100
		12UZOP02	Core practical II	--	3	4	40	60	100
			Allied Theory Botany	4	--	4	25	75	100
			Allied practical-II	--	3	3	40	60	100
	IV	12UZONM2	NMEC Apiculture	2	--	2	25	75	100
V	III	12UZO05	Core V Animal Physiology	5	--	5	25	75	100
		12UZO06	Core VI Developmental Biology & Immunology	5	-	5	25	75	100
		12UZOEL1	Elective theory MLT I	5	--	5	25	75	100
		12UZOEL2	Elective II Biostatistics &Com. Appl	5	--	5	25	75	100
		12UZOSB3	SBEC III Biotech	2	--	2	25	75	100
		12UZOSB4	SBEC IV	2	--	2	25	75	100

			Aquaculture						
VI	III	112UZO07	Core VII Ecology	5	--	5	25	75	100
		12UZO08	Core VIII Evolution	5	--	5	25	75	100
		12UZO09	Core IX Microbiology & Biochemistry	5	--	5	25	75	100
		12UZOEL3	Elective III MLT II	5	--	5	25	75	100
		12UZOSB5	SBEC-V Vermi-technology	2	--	2	25	75	100
		12UZOSB6	SBEC VI Nutrition & Dietetics	2	--	2	25	75	100
		12UZOP03	Core Practical-III	--	3	4	40	60	100
		12UZOP04	Core practical IV	--	3	4	40	60	100
			Extension activities	--	--	1	--	--	--

FIRST SEMESTER
Core Paper I – INVERTEBBRATA
Paper Code: 12UZO01

SCOPE:
Structure and physiology of the types included with special reference to the adaptations based on their mode of life and environment.
General characters, Classification up to class level with examples and phylogenetic affinities of the invertebrate phyla included in the syllabus.along with general topics.

UNIT I
A brief introduction and nomenclature - Level of Organization.
Phylum Protozoa: General characters- Classifications. Type study-Paramecium-Structure and Reproduction. General Topic: Protozoan Diseases.

UNIT II
Phylum Porifera: General characters- Type study- Ascon- Cellular structure.
Phylum Coelenterata: Classification- Type study- Aurelia- Structure and life history.
General Topic: Canal system in Sponges, Polymorphism in Coelenterates.

UNIT III
Phylum Platyhelmenthes: General Characters- Classification- Type study- Liver fluke- Structure and Reproduction.
Phylum Annelida: General characters- Type study- Nereis- External morphology and reproduction.
General Topic: Helminth Parasites in Man.

UNIT IV
Phylum Arthropoda: General characters- Type Study- Penaeus- External morphology and reproduction.
Phylum Mollusca: General characters- Type study – Unio (Lamellidens) - External morphology and digestive system.
General Topic: Mouth parts of Insects- Economic Importance of Mollusca.

UNIT V
Phylum Echinodermata: General characters- Type study- Starfish (Asterias rubens) - External morphology. Water vascular system in Star Fish.
General Topic: Larval forms of Echinoderms.

References
Agarwal V.K (2000) Invertebrate Zoology- S.Chand Company.
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.
Kotpal R.L (2003) Modern text book of Zoology- Rostogi Publications, Meerut.

SECOND SEMESTER
Core paper II - CHORDATA
Paper code: 12UZO 02

UNIT I

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 and Reproductive system

General Topic: Accessory respiratory organs in fishes.

UNIT II

Class : Amphibia :General characters and classification -Type Study : Frog –External characters, Digestive ,Respiratory, Circulatory and Reproductive systems - Structure of Brain.

Class: Reptelia: General characters- Type study –Calotes- External characters-Digestive, Respiratory, Circulatory and Reproductive systems- Structure of Brain. General Topic: Identification of Poisonous and Non- Poisonous snakes. Golden age of Reptiles.

UNIT III

Class: Aves- General characters- Type Study-Pigeon- External characters -Digestive, Respiratory ,Circulatory and Reproductive Systems- Structure of brain.

General Topic: Flight adaptations in Birds, Migration in Birds

UNIT IV

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

General Topic: Dentition in mammals, Aquatic mammals.

UNIT V

Comparative Study of Organ systems in vertebrates, Digestive system of Scoliodon, Pigeon and Rabbit, Brain of Scoliodon, Calotes and Rabbit , Heart of Scoliodon, Frog and Rabbit

Excretory system of Scoliodon and Rabbit, Reproductive system of Scoliodon and Pigeon

Comparative study of the Pectoral girdle and Pelvic girdle of Frog and Pigeon

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.

PRACTICAL I- INVERTEBATA& CHORDATA
Paper code: 12UZOP01

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 giving reations:
Entameba, Paramecium, Leucosolenia, Hyalonema, Aurelia, Obelia, Taenia, Ascaris, Earthworm, Nereis, Penaeus, Freshwater mussel, Starfish, Cockroach, Amphioxus, Salpa, Frog, Cobra, Pigeon, Rabbit.

b) Draw Labelled Sketch:
T.S. of Taenia ,T.S .of Fasciola , Ephyra larva , Nauplius larva , Zoea larva ,Quill feather , Frog –Pectoral girdle ,Pigeon –Pelvic girdle .

c) Biological Significance:
Sponge –Gemmule, Physalia, Leech, Limulus, Bipinnaria, Ascidian tadpole larva, Ichthiophis, Peripatus.

d) Relate structure and function
Taenia –Scolex , Nereis – Parapodium, Peneus –Petasma, Star fish –Tube feet (ventral view), Echenies, Draco, Bat.

e) Comment on Respiratory /skeletal/ dentition of the following
Star fish, Synsacrum, Dentition of Rabbit and Dog.

Submission of Practical record

SKILL BASED ELECTIVE COURSE (SBEC) I
ORNAMENTAL FISHERIES
Paper Code: 12UZOSBI

UNIT I

Construction of home aquarium, materials used –Wooden, metal frameless tanks, Aerators and filters. Hand nets and other equipments, Water quality requirements, Temperature control.

UNIT II

Nutritional requirements of ornamental fishes. Different kinds of feeds, Culture of fish food organisms, Preparation of dry feed and feeding methods .

UNIT III

Cleaning the aquarium, maintenance of water quality. Control of Snail and Algal growth. Common ornamental fish diseases, their diagnosis and treatment.

UNIT IV

Fresh water ornamental fishes, their taxonomy and biology. Maturation, Secondary sexual characters, breeding habits, spawning and parental care. Fertilization and development of eggs, induced breeding. Fresh water aquarium plants.

UNIT V

Marine ornamental fishes, their habits and collection from nature. Methods of collection, transportation of live fishes.

REFERENCES:

Coffey, D.J (1977) Encyclopedia of Aquarium fishes in colour . Aero publications.

RobertsR .J. (Eds) (1978) Fish Pathology.

Jhingran, V.G. (1982) Fish and Fisheries in India.Hindustan Publishing Corporation, New Delhi.

THIRD SEMESTER
Core Paper III-CELL BIOLOGY
Paper code - 12UZO03

UNIT- I

Prokaryotic and eukaryotic cells –Ultrastructure and Organization.

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

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

UNIT- II

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- III

Ribosomes: Ultra structure-types- chemical composition - functions. Nucleus and Neucleolus: Ultra structure of Nucleus and Nucleolus.

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

UNIT- IV

Chromosomes: Ultra structure of Chromosomes and Giant Chromosomes, Cell division- mitosis and meiosis. Cell cycle, Cancer biology - Types of Cancer, Oncogenes, Chemotherapy.

UNIT V

Cytological techniques –Cell fractionation, Isolation of sub cellular components. Fixation – Sectioning and staining. Paper chromatography and Thin layer chromatography. Tissue culture.

TEXT BOOKS :

Cell biology. Veer Bala Rastogi, Rastogi Publications.

Cell Biology, Power.

SKILL BASED ELECTIVE COURSE (SBEC) II
FISH PRESERVATION AND ECONOMIC IMPORTANCE
Paper Code: 12UZO SB2

UNIT I
Principles and importance of fish preservation – Sun drying, Smoking, Salt curing, Chilling Pickling, Frying and Canning **.**

UNIT II
Application of economic principle of fisheries – Traditional and Economical .Commercial fishing operations in marine fisheries .

UNIT III
Economics of fish markets, marketing and resources managements. Fisheries projects and fish resources .

UNIT IV
Preparation of value added products - fish pickle, fish cutlet, fish waters, fish biscuits, fish fingers –Methods and applications.

UNIT V
Extention education – Objectives and principles –Role of extension in community development .

REFERFNCES:
Freezing preservation of foods. Vol 3. Commercial food freezing operations of fresh foods.

Trawlers .D.K. and Others (Edn) VI Connecticut .

Canning technology. Howard, A .J. Churchill, London**.**

NON MAJOR ELECTIVE COURSE (NMEC) I
SERICULTURE
Paper Code: 12 UZONM I

UNIT I

Types of silk worms –Mulberry, Tasar, Muga, and Eri. Morphology and life cycle of mulberry silk worm **.**

UNIT II

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

UNIT III

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

UNIT IV

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

UNIT V

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

FIELD VISIT TO SILK WORM REARING PLACE AND REELING INDUSTRY **.**

TEXT BOOKS:

An Introduction to sericulture (IInd edition) G.Ganga and Sulochana chetty .

RANGASWAMY .G. ,(1987) .Manual on sericulture FAO, Vol –IV, Agriculture service bulletin ,CSB , Bangalore , India **.**

REFERENCES:

DANDAN .S .B. (2004) ,Hand book of new sericulture technologies ,Central Silk Board Bangalore, pp 287 **.**

FOURTH SEMESTER
CORE PAPER IV - GENETICS
Paper Code: 12UZO 04

UNIT I

Introduction –Laws of Mendel –Interaction of genes (Epistatic gene ,Complementary genes and Lethal genes . Inheritance of Blood group in man and Coat colour in Rabbit .

UNIT II

Mechanism of linkage and crossing over –Types and theories - Chromosomal Mapping –Sex linked inheritance (haemophilia, and colour blindness). Sex limited inheritance and sex influenced inheritance .

UNIT III

Sex determination in man, Drosophila and Bonellia. Mutations – Point mutation and Chromosomal aberrations and mutagens **.**

UNIT IV

Inbreeding and out breeding, heterosis –Genetic applications in animals. DNA as genetic material –Experiments . Syndromes (Down syndrome and Turners syndrome in man) **.**

UNIT V

Human genome project –Genomic imprinting ,Gene fine structure –Gene cloning and sequencing –Genetic Engineering – Recombinant DNA technology .

TEXT BOOKS :

Verma P.S. and Agarwal V. K . –Concepts of Genetics .

Rastogi V.B. A text book of Genetics, K.Ramnath, Meerut.

Sambamurthy A. – Genetics – Narosa Pub, New Delhi**.**

NON MAJOR ELECTIVE COURSE (NMEC) II
APICULTURE
Paper Code: 12UZO NM2

UNIT I

Species of Honey bees – Life history of Honey bee – behaviour – swarming – pheromone.

UNIT II

Bee colony – castes – natural colonies and their yield – Structure and locations of natural beehives.

UNIT III

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

UNIT IV

Honey – composition and use Bee wax and its uses –Diseases of honey bees and their control methods.

UNIT V

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

REFERENCES:

Cherian R, & K.R. Ramanathan, 1992 – Bee keeping in India,

Mishra, R.C., 1985 – Honey bees and their Management in India. ICAR.

Singh, S.1982- Bee keeping – ICAR

Sharma, P and Singh L.1987 – Hand book of bee keeping. Chandigarh.

Rare, S. 1998 – Introduction to keeping, Vikas publishing house.

CORE PRACTICAL II

CELL BIOLOGY AND GENETICS

Paper Code: 12UZO P02

I Major Practicals

Use Microscopes, Camera Lucida, Stage and Ocular micrometers.

Total Counting of RBC / WBC Using haemocytometer.

Blood Smear Prepartion, Differential count of WBC.

Mounting Buccal Epithelium and observing living cells using vital staining.

Study of mitotic division using onion root tips.

Study of prepared slides of different tissues.

Submission of practical record.

B.GENETICS PRACTICALS

Observation of common mutants of drosophila

Preparation of mounting of the salivary gland in chironomous larva

Submission of practical record.

FIFTH SEMESTER
CORE PAPER V ANIMAL PHYSIOLOGY
Paper Code –12UZO 05

UNIT I

Nutrition –types, Enzymes – Enzyme action, Coenzymes, Digestion in man. Respiration – Respiratory pigments, role in transport of O2 and CO2 in man. Circulation - blood composition, origin and conduction of heart beat in an – blood pressure, Heart diseases– heart attack.

UNIT II

Excretion – types of nitrogenous wastes – structure of the mammalian kidney and urine formation – renal failure – kidney stone – kidney transplantation.

Osmotic – ionic regulation in freshwater, marine, estuarine and terrestrial organisms

UNIT III

Amoeboid, ciliary and flagellar movements.

Types of muscles – ultra structure of skeletal muscle – Muscle contraction and theories

UNIT IV

Neuron, - Types- Impulse transmission, -synaptic transmission - reflex action.

-Endocrine glands in man, secretions and disorders.

UNIT V

Receptors – chemoreceptor; mechanoreceptor, rheo, phono and photoreceptors**.**

Animal behaviour, bioluminescence, biological rhythms – biological clocks.

TEXT BOOKS:

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.,

REFERENCES:

Hoar, W.S (1987) General and Comparative physiology, prentice – Hall.

M.K.Chanddrashekaran – Circadian Rhythms – Madras science foundation, Chennai**.**

CORE PAPER VI
DEVELOPMENTAL BIOLOGY AND IMMUNOLOGY
Paper Code: 12UZO 06

UNIT I

Spermatogenesis – definition – process and significance, structure of mammalian sperm. Oogenesis – definition – process and significance – Types of eggs and egg membranes. Fertilization – definition – process and significance. Parthenogenesis – definition and significance – types of parthenogenesis.

UNIT II

Cleavage patterns (types) – Cleavage in Frog, Chick and Mammals. Morula and Blastulation. Fate maps – Gastrulation in Frog and Chick. Development of brain and eye in frog. Organizer, Placenta in mammals.

UNIT III

Metamorphosis – definition and significance. Hormonal control of metamorphosis in amphibians. –Regeneration in vertebrates.

UNIT IV

Introduction – cells and organs involved in immune response. Types of immunity – Innate & adaptive immunity of acquired immunity, humoral and cell mediated immunity, active and passive immunity.

UNIT V

Immune response – Primary and secondary. Antibody types – IgG, IgM, IgA, IgE and IgD, role of antibodies, and vaccines. Hyper sensitivity and auto immunity. Tissue transplantation and autommune disorder.

TEXT BOOKS:

De Beer, G.R. Embryos and Ancestors. Clarenden Press, Oxford.

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.3 rd Edition 1981**.**

Eli Benjamini et al.,(1991) Immunology – A short course – Wiley Publishers, NY.

ELECTIVE THEORY- I
MEDICAL LABORATORY TECHNIQUES (MLT) I
Paper code – 12UZO EL1

UNIT I

Principles uses and a of laboratory instruments – Autoclave, hot air oven, incubators, water bath, Centrifuge, Refrigerator, Colorimeter, $_{P}$H meter, Heamoglobinometer, Haemocytometer, Kymograph unit, Microtomes, Electrophoresis.

UNIT II

Cleaning, care and sterilization of glasswares. Preparation and uses of reagents – normal saline – Turkey's fluid, and Acetocalamine.

General and personal car in the lab to avoid accidents – First Aid.

UNIT III

Tissue preparation – fixing – embedding- sectioning staining and mounting – vital staining.

UNIT IV

Spigmomonometer, ECG and Respirometer, Methods of bacterial culture.

UNIT V

Blood cell morphology in health and disease, knowledge and skill in collection of blood samples in blood bank.

REFERENCES:

Medical Laboratory Technology vol I, II, III –Kanai L. Mukherjee, Tata McGraw Hill Publishing Ltd., New Delhi.

Medical Laboratory Technology – Ramanik Sood – Jaypee Brother's Medical Publishers (P) Ltd., New Delhi.

ELECTIVE THEORY II
BIOSTATISTICS AND COMPUTER APPLICATIONS
Paper Code –12UZO EL2

UNIT I

Introduction-definition, date types – primary and secondary – Classification of data, Collection of data – tabular and graphical representation – Bar diagram, Pi diagram, Column graph, Histogram, Ogive curves.

UNIT II

Measures of central tendency – Mean, Mode and Median, Variance, Standard deviation, Standard error and Coefficient or variance.

UNIT III

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

UNIT IV

Fundamentals of Computer: Classification, Computer organization, Input devices, processing unit, output devices, external storage devices, software, WWW, CONCEPT OF E-Mail.

UNIT V

Computer and its application to biology-Definition and scope of Bioinformatics - application and introduction to Biological data.

REFERENCES:

Introduction of Biostatistics and Computer Science – Y.I Parkar & M.G Dhanyagude NiraliPrakashan publishers, Pune.

Biostatistics by K.S. Negi ATIBS publications & distributiors, New Delhi.

Bishop O.N. Statistics for Biology. Boston, Hollghtan, Mifflin.

Introduction to Biostatistics by Pranab kumar, S.Chand company Ltd. New Delhi.

SKILL BASED ELECTIVE COURSE (SBEC) III

BIOTECHNOLOGY

Paper Code: 12UZO SB3

UNIT I

Scope of Biotechnology . Recombinant DNA technology.

UNIT II

Restriction endonucleases –Type I ,Type II ,TYPE III , DNA ligases, alkaline phosphatases**.**

UNIT III

Agarose gel electrophoresis –Poly-acrylamide gel electrophoresis –Polymerase Chain Reaction.(PCR).

UNIT IV

Vectors – Bacterial vector –Pbr, 322, Ti plasmid, Cosmids, Phage vectors –Lamda**.**

UNIT V

Application of Biotechnology in Agriculture, Industries, Pharmacy – Human welfare**.**

REFERENCES:

R.C.Dubey (1998).A Text book of Biotechnology ,S.Chand& co Ltd New Delhi .

S.Ignachi muthu(1995).Basic Biotechnology.Tata McGraw Hill publishing co Ltd ,New Delhi .

Animal Biotechnology by Dr .Ramadas .

Animal Biotechnology by Ranga .

SKILL BASED ELECTIVE COURSE (SBEC) IV

AQUACULTURE

Paper Code: 12UZO SB 4

UNIT I

Definition and history of aquaculture – Principles of site selection for various kinds of fish farms ,water , soil, characters 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 for culture – Seed procurement and stocking management. Water quality management.

UNIT IV

Nutritional requirements and formation of artificial diets. Breeding and culture of Brackish water fin fishes - milk fish, grey mullets, pearl spots, cocks up etc.,

UNIT V

Mari culture – Culture of edible oyster, pearl oyster, mussels, clams, sea urchins, sea cucumbers . Fin fish culture in pen and cages.

REFERENCES:

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.

Home Aquarium:aquatic gema and tropical fish ,1970, Makinos Japan Publications .

SIXTH SEMESTER

CORE PAPER VII – ECOLOGY

Paper code: 12UZO 07

UNIT I

Abiotic factors of the Environment : Temperature, Light and .Oxygen.

Bio geo chemical cycles with special reference to Nitrogen Phosphorous and Carbon.

Biotic factors of the environment - Animal relationship.

UNIT II

Population : characteristics –Natality, Mortality, Density, and age distribution, population control, life-tables, Community, structure, stratification and components, Food chains, Food webs and Ecological pyramids.

UNIT III

Pond as a Ecosystem, energy flow and ecological succession. Habitats – Terrestrial – Aquatic – Marine, Fresh water and estuary.

UNIT IV

Air pollution, Water pollution and Oil pollution. Noise pollution and Thermal pollution.

UNIT V

Environmental resources- renewable and non renewable resources. Forest resources- Protection – Chipko movement- A forestation. Wild life management- 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

CORE PAPER VIII

EVOLUTION

PAPER CODE: 12UZO08

UNIT I

History of Evolutionary thought - Origin of life –Chemical evolution. Evolution of self replicating systems –DNA world and RNA world.

UNIT II

Evidences from Paleontology -Comparative anatomy, Embryology, Physiology and Bio chemistry. Bio geography –Distribution in continents ,Continuous and discontinuous distribution - Endemism .

UNIT III

Lamarckism and Neo Lamarckism, Darwinism and Neo Darwinism. Modern synthetic theory, Quantum evolution, Mosaic evolution and Neotany.

UNIT IV

Natural selection- Species and Speciation- Sympatric and allopatric speciation. Isolating mechanism- mutation and genetic drift.

UNIT V

Adaptation and adaptive radiation, Colouration-mimicry-Darwins finches. Polymorphism-types and significance. Convergent-Divergent-parallel and co-evolution of Man and cultural evolution.

TEXT BOOKS:

1) Rostogi, V.B. Organic Evolution, Kedernath, Ramnath publishers, Meerut.
2) Verma P.S. & Agarval, V.L. concepts of evolution S.Chand& Company.

REFERENCES:

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

CORE PAPER-IX

MICROBIOLOGY AND BIOCHEMISTRY

Paper Code- 12UZO 09

UNIT I

Classification of microorganisms- General characteristics of Bacteria, Virus, Yeast.
Bacteria- Morphology, Bacterial cell structure, Motility, Nutrition and Reproduction.
Virus-discovery- Morphology, Classification, phages and life cycle.
Yeast-Morphology, cell structure, Multiplication, phages and cycle.

UNIT II

Morphology of water, air soil and sewage.
Water-Microoorganisms of water, total bacterial count.
Air- Microorganisms in soil, nitrogen cycle.
Sewage-Composition of sewage, treatment of sewage by microorganisms.

UNIT III

Food borne diseases- Microbial food poisoning by Salmonella and Clostiridium botulinum (Botulism).Measures to prevent microbial food poisoning. Food infection-Food borne diseases-Diarrhea, Dysentery, Typoid and Cholera.Water borne diseases-Hepatitis, Gastro enteritis, Camphlo bacter-diarrhea, Gardia lamblia, Cryptosporidiosis cholera. Air borne diseases-Common cold, Tuberculosis, Pneumonia, Diphtheria.

UNIT IV

Biochemistry- Definition and its importance, Physio- chemical forces acting on the living body –a) Definition of pH and its determination, Maintenance of pH of blood.
b)(Definition of osmosis, abnormality in edema and dehydration.
Nucleic acids, structure and classification.

UNIT V

Carbohydrates, lipids, Amino acids & proteins-Classification, structure and their function. Metabolism- Glycolysis-TCA cycle - Electorn Transport chain, Urea cycle Deamination, Oxidation of fatty acids.

REFERENCES:

Microbiology- Pelzer.
Biology of Microorganism- Madigan-Brock
Microbiology Lab manual – Capachim.
Microbiology fundamentals and application- Atlas.R.M.
Principles of Biochemistry A.L. Lehninger, D.L. Nelson& M.M. Cox (1993) Worth publishes New York.
Biochemistry by L.Stryer (1994) freeman & co., Newyork.
Biochemistry by Zubay (1998) Macmillan publishers & co., New York.

ELECTIVE THEORY -III

MEDICAL LABORATORY TECHNIQUES (MLT) II

Paper Code- 12UZO EL3

UNIT I

RBC, WBC, Total count, WBC differential count, Haemocrit, Packed Cell Volume (PVC), and Erythrocyte Sedimentation rate (ESR), Fragility test, platelet count, clotting time, bleeding time, prothrombin time.

UNIT II

Examination of urine –microscopic examination of organized and unorganized sediments. Examination of cerebrospinal fluid, Semen analysis, sperm motility- sperm count and morphology.

UNIT III

Analysis of faeces, Bone marrow smear, Immuno-electrophoresis.

UNIT IV

Protozoan parasites:

Malarial parasites, Endameba histolytica, Trypnosoma Gambians, Leishmania denoavani Study of vectors in the transmission of the disease.

UNIT V

Helminth parasites:

Ascaris lumbricoids, Taenia solium, Ancylostoma duodinale, Wuccheria Bancrofti, Trichuris.

REFERENCES:

Medical Laboratory technology, Volume- I, II and III. K.L Mukherjee.

Medical Laboratory Technology, Ramanik Sood. Jaypee Brother's. New Delhi.

SKILL BASED ELECTIVE COURSE (SBEC-V)

VERMITECHNOLOGY

PAPER CODE-12UZOSB 5

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 Books:

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.

SKILL BASED ELECTIVE COURSE (SBEC- VI)

NUTRITION AND DIETETICS

Paper Code- 12 UZO SB6

UNIT I

Diet – Definition, purpose of therapeutic diet, Principle and types of hospital diet- clear fluid, full fluid, soft light, blend and regular diet.

UNIT II

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

UNIT III

Mal nutrition, Obesity and Under weight – dietary management, Febrile conditions- Acute, Chronic and recurrent, Typhoid, TB and Malaria- dietary management.

UNIT IV

Type – I, II and gestational diabetic ethioloty, symptoms and dietary management.

UNIT V

Metabolic disorders- Phenyl ketonuria, Lactose intolerance, Hypo and Hyper-thyroidism, Gout causes, symptoms and dietary management.

REFERENCES:

Srilakshmi, B. Dietetics, New Age International (P).

Paul. S. Text book of Bionutrition curing diseases through diet. CBS Publications.

CORE PRACTICAL -III

ANIMAL PHYSIOLOGY, BIOCHEMISTRY AND DEVELOPMENTAL BIOLOGY

Paper code 12UZO P03

I Major Practicals:

1) Qualitative analysis of digestive enzymes in cockroach.
2) Estimation of the rate of o2 consumption in fish/crab with reference to body weight.
3) Detection nitrogenous waste products in fish tank water, bird excreta & mammalian urine.
4) Study of human salivary activity in relation to temperature.
5) Qualitative analysis of carbohydrates, proteins, and amino acids.

II Minor Practicals:

Kymograph –simple twitch, Trappe, Fatigue, Tetanus, Spigmomanometer, pH meter, Colorimeter, Haemometer, Enzyme action – graphs (temperature, concentration of substrate and enzyme.)

III Spotters

Developmental Biology-Slides

Slides of mammalian sperm and Ovum

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.

Submission of record.

CORE PRACTICAL IV

ECOLOGY, MLT, MICROBIOLOGY, BIOSTATISTICS AND COMPUTER APPLICATIONS

Paper Code 12UZOPO4

MAJOR PRACTICALS:

1.Estimation of dissolved oxygen content in the given water sample (Wrinklers method).

2. Estimation of salinity and pH in given water sample.

3. Plankton study –Identification and description of any five marine planktons.

MINOR PRACTICALS:

4. Examination of yeast, mould, protozoa and patho genic bacteria.
5. Estimation of urine sugar.
6. Blood grouping.
7. Problems on calculation of Mean, median, mode.

Spotters:

Description and uses of autoclave, Hot air oven, Incubator, Water both, Centrifuge, Refrigerator, pH meter, Colori meter, Microtome, Rain gauge, Anemometer, Maximum minimum thermometer, Hygrometer, and Barometer.

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

Submission of field Report.

Submission of Practical Record.

ALLIED ZOOLOGY

FIRST SEMESTER

Allied paper I- INVERTEBATE & CHORDATE ZOOLOGY

Paper code: 12UZO A01

UNIT I

Protozoa: Paramecium-structure and conjugation

Porifera: Leucosolenia- Structure

Coelenterata: Aurelia- Structure and its life history

General Topics: Protozoan Parasites- Plasmodium, Trypnasoma, Endameba

UNIT II

Platy helminthes: Fasciola Hepatica- Structure and its life cycle.

Annelida: Leech- Structure and Digestive system.

General Topic: Human Helminth Parasites- Taenia and wuchereria

UNIT III

Arthropoda: External Morphology of Penaeus, Mouth parts of Honey bee and Mosquito.

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

Echinodermata: Starfish –External characters.

General Topic: Water vascular system in Star fish.

UNIT IV

Chordata - Hemichordata: External characters of Amphioxus and its digestive system.

Pisces: External characters of Shark and its digestive system .

Amphibia: External characters of frog and respiratory system of frog.

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.

SECOND SEMESTER
ALLIED ZOOLOGY
Allied paper II
Paper code: 12UZO A02

UNIT I

CELL BIOOLOGY : 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 .

TEXT BOOK

Bernice Anandtharaj - Allied Zoology.

ALLIED ZOOLOGY - PRACTICAL I
Paper Code: 12UZOAP01

MAJOR PRACTICALS

Cockroach –Digestive, Nervous and Reproductive systems.

Appendages of Prawn.

MINOR PRACTICALS- MOUNTING:

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, Amphioxus, Shark, Cobra, Sea anemone on Hermit crab, Pigeon, Blastula of frog, 24 hours Chick embryo, Star fish, Redia, Cercaria, Nauplius and Mysis larva.

Submission of Practical Record.