PERIYAR UNIVERSITY SALEM – 636 011

B.Sc., ZOOLOGY (U.G) BRANCH - VI

REGULATIONS AND SYLLABUS Under the Choice Based Credit System (CBCS)

(Effective from the academic year 2008-09 onwards)

THE UNDER GRADUATE COURSE IN ZOOLOGY

AIM AND SCOPE OF THE COURSE :

- \checkmark 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 Dietics have been included in order to provide opportunities in employment and research in Government and Private organizations.
- \checkmark There is also scope for self-employment for the students.
- \checkmark 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.

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 as 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 into six semesters.

Each semester consists of 90 working days.

PASSING MINIMUM:

The candidate shall be declared to have passed the examination 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
Assignment	-	5 marks
Attendance	-	5 marks

Passing minimum for Internal Assessment -	10 marks
Passing minimum for University Examination -	30 marks

PRACTICALS

UNIVERSITY EXAMINATION	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 Examination -	30 marks

CLASSIFICATION OF SUCCESSFUL CANDIDATES:

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

		Carrier Carrier		Hou	irs		Marks		
Sem	Part	Course	(Subject)	Theory	Practi	Credits	CIA	EA	TOTAL
		Couc	(Subject)		cal		25	75	100
	Ι		Tamil – I	6	-	3	25	75	100
	II		English – I	6	-	3	25	75	100
			Core – I	5	-	5	25	75	100
		08UZO 01	Invertebrat						
			a		2				
			Core Prac		3	-	-	-	
Ι	111		Allied	4		3	25	75	100
			Theory –						
			Botany						
			Allied		3	-	-	-	
			Practical						
			Env.Studie	1	-	-	-	-	
	IV		S						
			Value.Edn	2	-	2	25	75	100
	Ι		Tamil – II	6	-	3	25	75	100
	II		English – II	6	-	3	25	75	100
		081170.02	Core – II	5		5	25	75	100
		08020 02	chordata	chordata	-	5	23	15	100
		08UZO P01	Core prac-I	-	3	3	40	60	100
			Allied						
	ш		Theory-	1	4 -	4	25	75	100
	111		Botany/	4				15	100
II			Chemistry						
			Allied Prac	-	3	3	40	60	100
			Env.Studie	1		2	25	75	100
			S	1	-	2	23	75	100
			Value Edn	-	-	-	-	-	
			SBEC						
	IV	08UZO SB1	Ornamental	2	-	2	25	75	100
			Fisheries						
			NMEC	-	-	-	-	-	-

		Course	Canada	Hours			Marks		
Sem	Part	Course	(Subject)	Theory	Practi	Credits	CIA	EA	TOTAL
		Coue	(Subject)	-	cal		25	75	100
	Ι		Tamil – III	6	-	3	25	75	100
	II		English - III	6	-	3	25	75	100
			Core - III						
		08UZO 03	Cell	4	-	5	25	75	100
			Biology						
			Core		2				
	ш		Prac-III		5	-	-	-	-
	111		Allied						
			Theory-	Δ	_	3	25	75	100
III			Chemistry/	Т		5	25	15	100
			Botany						
	-		Allied Prac	-	3		-	-	-
			Env.Studies	-	-	-	-	-	-
			Value.Edn	-	-	-	-	-	-
			SBEC (2)			2			
	IV	08UZO SB2	Fish	2	-		25	75	100
			Preservation	_				, 0	100
			& Eco.imp						
		08UZO NM1	NMEC	2	-	2	25	75	100
	T		Sericulture			2	25	75	100
	1		1 amil - 1 V	6	-	3	25	/5	100
	п		English –	6		2	25	75	100
	11			0	-	3	23	75	100
			Core – IV						
		08UZO 04	Genetics	6	-	5	25	75	100
			Core						
		08UZO P02	Prac-II	-	3	4	40	60	100
	III		Allied						
IV			Theory-					7.5	100
			Chemistry/	4	-	4	25	/5	100
			Botany						
			Allied Prac	-	3	3	40	60	100
			Env.Stu	_	_	-	_	-	
			Val. Edn	2		r	25	75	100
	N/		(Yoga)	۷	-	۷	23	15	100
	1.4		SBEC	-	-	-	-	-	-
		081170 NM2	NMEC	2		2	25	75	100
			Apiculture	2	-	۷	25	15	100

Commo		Course	Hou	Hours		Marks				
Sem	Part	Course	(Subject)	Theory	Practi	Credits	CIA	EA	TOTAL	
		Code	(Subject)		cal		25	75	100	
			Core-V							
		08UZO 05	Animal	5	-	5	25	75	100	
			Physiology							
			Core – VI							
		081170.06	Dev.biology	5	6	5	25	75	100	
		0002000	&	5	U	5	25	15	100	
			Immunology							
	III		Core Prac	-	-	-	-	-	-	
			Elective							
		08UZO EL1	Theory	5	5 -	5	25	75	100	
V			MLT -I							
			Elective – II							
		08UZO EL2	Biostatistics	5	-	5	25	75	100	
			&Com.appln							
			Env.Stu	-	-	-	-	-	-	
			Val.Edn	-	-	-	-	-	-	
		08UZO SB3	SBEC-III	2	_	2	25	75	100	
	IV	00020 505	Biotech	_		_	20	10	100	
		08UZO SB4	SBEC – IV	2	_	2	25	75	100	
			Aquaculture			_				
		08UZO 07	Core - VII	5	-	5	25	75	100	
			Ecology							
		08UZO 08	Core - VIII	5	-	5	25	75	100	
			Evolution							
	тт	091170.00	Core-IX	5		5	25	75	100	
	111	111	08020 09	Die ahom	5	5 -	5	25	15	100
			Cara Drag. III		2	4	40	60	100	
		08UZO P03	Core Prac - III	-	3	4	40	60	100	
		08020104	Elective III	-	5	4	40	00	100	
VI		08UZO EL3		5	5 -	5	25	75	100	
			Vol Edn							
			SPEC V	-	-	-	-	-	-	
		08UZO SB5	Bioinformatic	2	_	2	25	75	100	
		00020 303	Bioimormatic	2	-	2	25	15	100	
	IV		SBEC – VI							
	IV	08UZO SB6	Nutrition &	2	_	2	25	75	100	
			Dietics	-			20	,5	100	
			Extension							
			Activities		-	1				
	1	TOTAL				140				

FIRST SEMESTER

Core Paper I – INVERTEBRATA Paper Code : 08UZO 01

SCOPE

Structure and physiology of the types included with special emphasis on the adaptations to their modes of life and environment.

General characters, classification up to class level with examples and phylogenetic affinities of the invertebrate phyla included in the syllabus.

General topics.

UNIT I

A brief introduction and Nomenclature – Level of organization

Phylum : Protozoa :

General characters – Classification.– Type study – Paramecium – Structure and Reproduction.

General topic – Protozoa and Disease.

UNIT II

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

Phylum : Platyhelminthes – General characters – Classification – Type study – Liver fluke. Structure and Reproduction

Phylum : Annelida – General Characters – Type study – Nereis – External morphology and Reproduction
General Topics: Helminth Parasites in Man
UNIT IV
Phylum : Arthropoda – General characters – Type study – Penaeus – External morphology and Reproductive System
General Topic: Mouth parts of insects.
Phylum : Mollusca : General characters – Type Study – Unio (Lamellidens) – External morphology and digestive system
General Topic: "Economic Importance of Mollusca".
UNIT V
Phylum : Echinodermata : General characters – Type – Asterias rubens (starfish) – External morphology water vascular system in star fish
General Topic: Larval forms of Echinoderms.

REFERENCES:

1) Agarwal V.K. (2000) Invertebrate zoology – S. Chand and Company Ltd., publications.

2) Barnes R.D. (1987) Invertebrate zoology – Saunders College publications.

3) Barrington E.J.W., (1981) Invertebrate structure and function – ELBS – edition 1981.

4) Ekambaranatha Iyer (1993) Manual of Zoology – vol . I. Invertebrata.

S. Viswanathan (Printers & Publisher) Chennai.

5)Kotpal R.L. (2003) Modern text book of zoology – Invertebrates, Rostogi publication.

SECOND SEMESTER

Core Paper II - CHORDATA Paper Code : 08UZO 02

UNIT I

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

Class : Pisces, General Characters - Type study : Scaliodon - External Characters, Digestive, Excretory, Respiratory and Circulatory systems - Structure of Brain - Sense organs Reproductive System.

General Topic : Accessory respiratory organs in fishes.

UNIT II

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 - Degestive, Respiratory, Circulatory and Reproductive System - Structure of Brain.

General Topic : 1) Identification of poisonous and non-poisonous snakes.2) Golden Age of Reptiles.

UNIT III

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

General Topic (1) Flight adapations in Birds.

(2) Migration in Birds.

UNIT IV

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

General Topic (1) Dentition in Mammals

(2) Aquatic Mammals.

UNIT V

Comparative Study of Organ systems in vertebrates (Digestive, Respiratory, Circulatory, Excreatory and Reproductive systems) -

Comparative Study of Fore and Hind limbs of Vertebrates.

REFERENCES:

1) Ekambaranatha Iyer (1993) Manual of Zoology Vol.II,

Viswanathan (Printers & Publishers), Chennai.

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

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

PRACTICAL I – INVERTEBRATA & CHORDATA Paper Code : 08UZO P01

Time : 3Hrs

Maximum Marks: 60

I. Major Practicals:

(20 Marks)

Cockroach – Nervous system and Digestive system Frog – Digestive system and circulatory system. PRAWN : Nervous system.

II. Minor Practicals :

Earthworm body setae

Mouth parts of honey bee, mosquito and Cockroach.

Frog – Brain Mounting.

III. Spotters :

a) Classify Giving Reasons

Amoeba, paramecium, Aurelia, chaetopterus, halothuria, amphioxus, salpa, bufo, limulus, viper.

b) Drawing of Labelled Sketches :

Fasciola, T.S. of Fasciol, Ephyra larva, quill feather, pigeon-pectoral girdle, pelvic girdle.

c) Biological significance of the following

Sponge Gemmule, Physalia, Leech, Bipinnaria Larva, Ichthyophis, Ascidian tadpole.

d) Relating structure and function of the following

Spicules (Sponges), Starfish – tube feet, Antennule of prawn, pristis, Echinis, Bat, Cobra.

(10 Marks)

(20 Marks)

e) Comment on Respiratory / Skeletal structure / dentition of the following . Starfish, Synsacrum, Dentition of rabbit, and Dog.

IV. Record

(10 Marks)

Skill Based Elective Course (SBEC) I - ORNAMENTAL FISHERIES Paper Code : 08UZO SB1

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, preperation of dry feed and feeding methods.

UNIT III

Cleaning the aquarium, maintenance of water quality control of snail & algal growth. Common ornamental fish diseases, their diagnosis & treatment.

UNIT IV

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

UNIT V

Marine Ornamental fishes, their habits & collection from nature. Methods of collection, transportation of live fishes.

REFERENCES:

- Coffey, D.J. (1977) Encyclopedia of acquarium Fishes in colour. Aero publication.
- 2) Roberts R.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 - 08UZO 03

UNIT I

Prokaryotic and eukaryotic cells - ultra structure and Organization

Plasma membrane - Ultra structure - Chemical composition and functions — 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 Nucleolus : 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 Divisions : Mitosis, Meiosis and Cell Cycle.

Cancer biology : Types of Cancer, Oncogenes, Chemotherapy

UNIT: V

Cell Biology techniques : Cell fractionation - Isolation of sub cellular components-Fixation — Sectioning Principles — Biochemical techniques — Chromatography-Electrophoresis and their application - Tissue culture.

TEXT BOOKS:

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

2. Cell Biology by Power

REFERENCE BOOKS:

 De Rebertis EDP & De Robertis EMF. Cell & Molecular Biology. BI Wauerly PV+ Ltd, New Delhi. 8th Ed(1996)

2. Karp, G.Ccll & Molecular Biology- Concept & Experiments, Jhon Wiley & Sons Inc, New York(1996).

Skill Based Elective Course (SBEC) II FISH PRESERVATION AND ECONOMIC IMPORTANCE Paper Code : 08UZO SB2

UNIT I

Principles and importance of fish preservation, Sun Drying, smoking, salt curing, chilling, picking, frying and canning.

UNIT II

Application of economic principle of fisheries. Traditional and economical and commercial fishing operations in marine fisheries

UNIT III

Economics of fish markers, marketing and resources managements, Fisheries projects and fish resources.

UNIT IV

Preparation of value added products – fish pickle, fish cutlet, fish wafers, fish biscuits, fish fingers – methods and applications.

UNIT V

Extension education, objectives and principles - Role of extension in community development.

REFERENCES:

1. Freezing preservation of foods. Vol 3. Commercial food freezing operations fresh foods. Treswlers. D.K. and others (Eds.) AVI Connecticut.

2. Canning technology. Howard AJ. Churchill, London.

Non Major Elective Course (NMEC) I - SERICULTURE Paper Code 08UZO NM1

UNIT I

GENERAL ASPECTS OF SILKWORMS:

Types of silkworms - mulberry, tasar, muga, eri-morphology and life cycle of silkworms.

UNIT II

MULBERRY CULTIVATION:

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

UNIT III

SILKWORM REARING:

Disinfection of rearing houses and appliances – Egg transportation and incubation – Egg handling – Hatching – Brushing – Silkworm rearing techniques. Pest and diseases of silkworm & preventive measures. Harvesting of cocoon and cocoon assessment.

UNIT IV

GRAINAGE TECNIQUES :

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

UNIT V

SILK REELING:

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

Field visit to silkworm rearing place & reeling industry.

TEXT BOOKS:

1.An introduction to sericulture (IInd edition) G.Ganga & Sulochana chetty.2.RANGASWAMY .G .,(1987).Manual on sericulture FAO, Vol I-IV,Agriculture service bulletin ,CSB,Bangalore , India.

REFERENCES:

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

FOURTH SEMESTER

Core Paper IV - GENETICS Paper Code : 08UZO 04

UNIT I

Introduction – Laws of mendel – Interaction of Genes (Epistatic gene, Complementary gene, & 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, colourblindness) – sex limited Inheritance and sex influenced Inheritance.

UNIT III

Sex determination in man, Drosophila and Bonellia – Mutations – Point mutation and chromosomal abberations and mutagens.

UNIT IV

Inbreeding and outbreeding, heterosis – Genetic application in animals – DNA as genetic material – experiments – syndromes (Down's syndrome and Turner's syndrome in man)

UNIT V

Human Genome Project – Genomic imprinting. Gene fine structure – Gene cloning and sequencing – 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.

Non Major Elective Course (NMEC) II – APICULTURE Paper code : 08UZO NM2

UNIT I

Honeybee – systematic position – species of Honey bees – Life history of Honey bee – behaviour – swarming – pheromone.

UNIT II

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

UNIT III

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

UNIT IV

Honey – Composition – uses – Bee wax and its uses – yield in national and international market – 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:

- 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, Chandigar
- 5. Rare, S. 1998-Introduction. to bee keeping, Vikas publishing house.

CORE PRACTICAL II

CELL BIOLOGY AND GENETICS

Paper Code: 08UZO P02

Duration : 3 hours

Max marks : 60

A. CELL BIOLOGY PRACTICALS

- 1. Use of Microscopes, Camera Lucida, Stage and Ocular micrometers
- 2. Counting of RBC and / WBC Using haemocytometer
- 3. Blood Smear Preparation Differential count of WBC
- 4. Mounting Buccal Epithelium and observing living wells using vital staining
- 5. Study of mitotic division using onion root tips
- 6. Study of prepared slides of different tissues
- 7. Submission of practical records.

B. GENETICS PRACTICALS

- 1. Observation of common mutants of Drosophila
- 2. Preparation of mounting of the salivary gland in chironomous larva
- 3. Human blood grouping.
- 4. Submission of practical records.

<u>FIFTH SEMESTER</u>

Core Paper V - ANIMAL PHYSIOLOGY Paper Code - 08UZO 05

UNIT I

Nutrition, Respiration & Circulation:

Nutrition – types – Enzymes – Enzyme action – Coenzymes - Digestion in man.

Respiration - Respiratory pigments - role in transport of O_2 and CO_2 in man –

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

UNIT II

Detoxification pathways:

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

Osmo - ionic regulation in freshwater, marine, estuarine and terrestrial organisms (one example for each).

UNIT III

Locomotary physiology:

Amoeboid, ciliary and flagellar movement.

Muscle physiology – types of muscles – ultra structure of skeletal muscle – chemistry and energitics of muscle contraction – physical principles of muscle contraction.

UNIT IV

Regulatory mechanisms:

Nerve physiology – Neuron - types – impulse transmission – synapse - synaptic transmission – reflex action.

Endocrine physiology – Endocrine glands in man secretions and disorders.

UNIT V

Sensory and behavioral physiology:

Receptors - chemoreceptor; mechanoreceptor, rheoreceptor; phono and photoreceptors.

Animal behaviour, bioluminescence, biological rhythms - biological clocks.

TEXT BOOKS:

1.Verma P.S. & Tyagi B.S. Animal Physiology, 6/e S.Chand & Co.

2. Agarwal, V.K.Agarwal, R.A.Srivastava A.K. & Kausha Kumar, Animal physiology & Biochemistry, S. Chand & Co.,

REFERENCES:

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

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

Core Paper VI DEVELOPMENTAL BIOLOGY AND IMMUNOLOGY Paper Code : 08UZO 06

DEVELOPMENTAL BIOLOGY

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 pathenogenesis.

UNIT II

Cleavage patterns (types) – Cleavage in Frog, Chick and mammals. Morula and Blastulation. Fate maps – Gastrulation in amphioxus, Frog, Chick and mammals. Development of foetal membranes in chick. Placenta in mammal – Definition, significance and types.

UNIT III

Metamorphosis – definition and significance. Hormonal control of metamorphosis in amphibians. Induced ovulation – Artificial fertilization – Gradient theory. Organiser – Regeneration.

<u>IMMUNOLOGY</u>

UNIT IV

Introduction – cells and organs involved in immune response. Types of immunity – Innate & adaptive immunity or aquired 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, (antibody diversity) and vaccines. Hyper sensitivity and auto immunity. Tissue transplantation and autoimmune disorde.

TEXT BOOKS:

1)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).

2)Bodmer, Modern Embryology, Hold Rinefiar & Winston. N.Y.

Balinsky, introduction to Embryology, Saunders International student edition, Philadelphia. 3rd Edition 1981.

3)Eli Benjamini et.ol (1991) mmunology – A short course - Wiley – Lish Publishers, NY. Kuby. J. (1997)

ELECTIVE THEORY I MEDICAL LABORATORY TECHNIQUES (MLT) I Paper code - 08UZO EL1

UNIT I

Instruments and Equipments

Principles and maintenance of laboratory instruments – Autoclave, hot air oven, incubators, water bath, Centrifuge, Refrigerator, Microscopes, Colorimeter, pH meter, Haemoglobino meter, Haemocytometer, Kynograph unit, Microtomes, Balance and Electrophoreses.

UNIT II

Cleaning, care and sterilization of laboratory items such as glassware. Preparation of reagents – normal saline – Turkey's fluid, Hayem's fluid, Leishman's stain, Wright stain, Carnoy's fluid and Bovin's fluid and Aceto carmine.

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

UNIT III

Histopathology

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

UNIT IV

Clinical Physiology

Use of blood pressure apparatus, ECG and Respirometer. Techniques for bacterial culture.

UNIT V

Haematology

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 compamy 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 - 08UZO EL2

UNIT I

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

UNIT II

Measures of central tendency-Mean, Mode and Median, Variance, Standard deviation, Standard error and Coefficient of 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, programming languages & machine languages, binary digits.

UNIT V

Networking and internet: Introduction to networks, types of network, application of network, use of internet, WWW, concept of E-Mail. Computer and its application to biology

REFERENCES:

1)Introduction of biostatistics& computer science-Y.I.Parakar & M.G Dhanyagude NiraliPrakasahan publishers,pune

2)Biostatistics by K.S.Negi AITBS publications& distributors, New Delhi

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

3)Introduction to Biostatistics by pranabkumar, S.Chand company Ltd.New Delhi.

4)Fundamental of Computers of Raja Kumar, V., PHI

Skill Based Elective Course (SBEC) - III BIOTECHNOLOGY Paper Code - 08UZO SB3

UNIT I

Scope of Biotechnology Biotechnology in India.-Recombinant DNA technology

UNIT II

Restriction endonucleases-Type-I, Type-II, Type-III.DNA ligases, alkaline phospatases.

UNIT III

Biotechnological Techniques-Agrose gel Electrophorosis-Poly acrylamide gel electrophorosis-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:

1. R.C Dubey(1998)

A Text book of Biotechnology

S.Chand & Co Ltd New Delhi.

2. S.Ignacimuthu (1995)

Basic Biotechnology

Tata McGraw Hill publishing co Ltd

New Delhi

- 3. Animal Biotechnology by Dr.Ramadas
- 4. Animal Biotechnology by Ranga

Skill Based Elective Course (SBEC) - IV AQUACULTURE Paper Code:08UZO SB4

UNIT I

Definition and history of aquaculture-Principles of site selection for various kinds of fish farms, water, soil characteristics and other parameters.

UNIT II

Types of aquaculture-Monoculture, Polyculture, integrated farming, pond culture, pen and cage culture, Ralt culture, Raceway culture, Warm and cold water fish culture.

UNIT III

Criteria for selection of species for culture - Seed procurement and stocking management. Water quality management. Nutritional requirements and formation of artificial diets.

UNIT IV

Breeding and culture of Brackish water fin fishes, milk fish, grey mullets, pearlspots, cocksup etc., Monoculture and poly culture.

UNIT V

Mariculture – Culture of edible oysters, mussels, clams, sea urchins, sea cucumbers, pearl oysters -Finfish culture in Pen and Cages.

REFERENCES:

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

SIXTH SEMESTER Core Paper VII - ECOLOGY Paper Code: 08UZO 07

UNIT I

Abiotic factors of the Environment : Limiting factors – Temperature and light. Nutrients – Biogeochemical cycles with special reference to Nitrogen, Phosphorous and Carbon, Biotic factors of the Environment : Relationships among organisms.

UNIT II

Synecology (Or) Community Ecology

Population : characteristics – Natality, Mortality, Density and age distribution, population control, life – tables. Community characteristics – structure, stratification components – producers, consumers, decomposers & transformers ; Food relationship – food chains and food webs. Ecological succession.

UNIT III

Ecosystem : Characteristics, ecological pyramids - Pond as an ecosystem, energy flow. Habitats – Terrestrial – aquatic – marine and fresh water & Estuary.

UNIT IV

Pollution ecology

Pollution types – Biodegradable and Non Degradable. Air pollution, Water pollution, Oil pollution. Noise pollution – sources – effects.

UNIT V

Environmental management (or) applied ecology

Environmental resources – Types – Renewable and nonrenewable. Resource management – Food resources – Aquaculture & Fisheries – forest resources – protection – chipko movement – Afforestation. Wild life management – wild life sanctuaries – National parks.

TEXT BOOKS:

1)H.D. Kumar, Modern concepts of Ecology, Vikas publishing house.

E.D. Sharma (1998) Rastogi publication, Meerut.

2)E.P. Odum, Fundamentals of Ecology.

3)Clark, G.C. Elements of Ecology, John wiley sons, Inc Newyork.

Core Paper VIII - EVOLUTION Paper Code: 08UZO 08

UNIT I

History and origin of life:

History of Evolutionary thought – origin of life – chemical evolution – Evolution of self replicating systems – DNA world & RNA world.

UNIT II

Evidences

Evidences from paleontology, comparative anatomy, - Embryology, physiology & bio-chemistry and biogeography - Distribution in continents, continuous and discontinuous distribution in islands – endemism.

UNIT III

Theories and concepts

Lamarckism and neolamarckism – Darwinism and Neo Darwinism. Modern synthetic theory, quantum Evolution, mosaic evolution and Neotany.

UNIT IV

Mechanism of Evolution

Natural selection ; species & speciation - sympatric and allopatric speciation. Isolating mechanisms - mutation and genetic drift.

UNIT V

Adaptation and adaptive Radiation, colouration – mimicry – Darwin's Finches. Polymorphism – types and significance. Convergent – Divergent – parallel and co-evolution. Evolution of Man & cultural evolution.

TEXT BOOKS:

1)Rastogi, V.B. Organic Evolution , Kedarnath, Ramnath publishers, Meerut. Verma, P.S. & Agarwal, V.L., concepts of Evolution S.Chand & Company

REFERENCES:

1)Introduction to Evolution – Dodson- Evolution : Process & Product.

Core Paper IX MICROBIOLOGY AND BIOCHEMISTRY Paper Code - 08UZO 09

Objectives

To enable students gain knowledge about the role of microorganism in health and diseases

Develop an understanding of the principles of biochemistry (as applicable to human nutrition)

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 life cycle.

UNIT II

Microbiology of water, air, soil and sewage

Water-Microorganisms 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 Clostridium botulinum (Botuilsm).Measures to prevent microbial food poisoning. Food infection- Food born diseases- Diarrhea, Dysentery, Typhoid and Cholera.

Water born diseases-Hepatitis, Gastro enteritis, Camphlo bacter-diarrhoea, gardia lamblia,Cryptosporidiosis Cholera.

Air borne diseases-Common cold, tuberculosis, pneumonia, diphtheria.

UNIT IV

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

UNIT V

Carbohydrates, lipids, Amino acids &Proteins –Classification, structure and their function. Metabolism-Glycolysis-TCA cycle-Electron transport chain, Urea cycle, Deamination, Oxidation of fatty acids. Vitamins and their functions.

REFERENCES:

- 1. Microbiology- Pelczar
- 2. Biology of Microorganism- Madigan-Brock
- 3. Microbiology lab manual-Capachim
- 4. Microbiology fundamentals and application-Atlas.R.M
- 5. Principles of Biochemistry y A.L Lehninger, D.L Nelson& M.M.Cox (1993)
- Worth publishers Newyork.
- 6. Biochemistry By L.Stryer (1994) freeman&co., Newyork
- 7. Biochemistry By Zubay (1998) Macmillan publishers co., New York

ELECTIVE THEORY III MEDICAL LABORATORY TECHNIQUES (MLT) II PAPER CODE - 08UZO EL3

UNIT I

Haematological Tests

RBC, WBC, Total count, WBC differential count, Haematocrit, Packed Cell Volume (PCV), Erythrocyte sedimentation rate (ESR), fragility test, platelet count, clotting time, bleeding time, prothrombin time, clotting factors,

UNIT II

Pathological Analysis

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

UNIT III

Faeces Analysis – preparation of bone marrow smear – Immuno-electrophoreses.

UNIT IV

Examination of parasites relevant to human health

Protozoan parasites:

- 1. Malarial parasite
- 2. Entamoeba histolytica
- 3. Trypanosoma gambiens
- 4. Leishmania denoavani

Study of vectors in the transmission of the disease.

UNIT V

Helminths parasites

- 1. Ascaris lumbricoids
- 2. Taenia solium
- 3. Ancyclostoma duodinale

- 4. Wucheria bancrofti
- 5. Trichuris

REFERENCES:

- 1. Medical Laboratory Technology vol I,II,III Kanai.L.Mukherjee, Tata McGraw Hill Publishing compamy Ltd.,New Delhi (1989).
- Medical Laboratory Technology Ramanik Sood –Jaypee Brother's Medical Publishers (P) Ltd., New Delhi (1988).

Skill Based Elective Course (SBEC) V BIOINFORMATICS Paper Code - 08UZO SB5

UNIT I

Definition - Scope of Bioinformatics-Application of Bioinformatics-Introduction to Biological data. Amino acid sequence, DNA sequence, RNA sequence

UNIT II

Database-Biological databases-Sequence databases NCBI, EMBL and DDBJ- Protein sequence databases-SWISSPROT, PIR and PROSITE.

UNIT III

Introduction to Internet, ISTN, WWW, HTTP, Network-LAN, WAN, MAN, MODEM, ERNET, VSNL and BSNL.

UNIT IV

Structure databases-PDB, CATH, SCOP, Specialized database

UNIT V

Protein classification- primary, secondary, tertiary and quart nary structure, BLAST and FASTA

REFERENCES:

1. Bioinformatics., S.Ignacimuthu

 Adams., M.D Fields C.Venker.J.C1994 Automated DNA Sequencing and Analysis Academic press London

Skill Based Elective Course (SBEC) VI NUTRITION & DIETETICS Paper Code - 08UZO SB6

This Paper will enclose the student :

Knows the principles of diet theory

Understand the modifications of normal diet for therapeutic purpose

Understand the role of dietitian

Dietitian and therapeutic diets:

UNIT I

Types and qualities of dietary.

Diet theory – Definition, purpose of therapeutic diet, principles and types of hospital diet – clear fluid, full fluid, soft light, bland and regular diet.

UNIT II

Diseases of the gastro intestinal tract.

Gastric and duodenal ulcer, diarrhea, constipation, mal absorption syndrome, Dietary Management.

UNIT III

Malnutrition and febrile conditions, Obesity and underweight - Causes, symptoms. Febrile condition-Acute, Chronic and recurrent –Typhoid, TB, and Malaria-Causes, symptoms and dietary management.

UNIT IV

Type-I, Type-II gestational diabetes-etiology, symptioms 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) limited publication, 2002.

Paul. S Text book of Bionutrition curing diseases through diet,CBS publication, fourth edition 2005

Core Practical – III PHYSIOLOGY, BIOSTATISTICS & COMPUTER FUNDAMENTALS, BIOCHEMISTRY AND DEVELOPMENTAL BIOLOGY

Paper Code - 08UZO P03

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. Study of ciliary activity in fresh water mussel in relation to temperature and calculation of Q10

4. Detection of Nitrogenous waste products in fish tank water, bird excreta & mammalian urine.

- 5. Study of human salivary activity in relation to temperature.
- 6. Qualitative analysis of carbohydrates, proteins and amino acids

SPOTTERS

Kymograph-simple muscle twitch, Trappe, fatique, Tetanus, Spigmomanometer, pH meter, Colorimeter, haemometer, Chromatography, Enzyme action-graphs (temperature, concentration of substrate and enzyme.)

Biostatistics – Problems on calculation of mean, median and mode. Computer applications- Hardware of computer, storage devices, mouse

DEVELOPMENTAL BIOLOGY - SLIDES

Slides of mammalian sperm and Ovum Slides of different developmental stages of chick embryos(24,48,72,96hrs) Slides of Blastula and gastrula of frog(morula, early gastrula, yolk plug stage, late gastrula) Placenta of sheep/pig/rat. Submission of practical record

Core Practical IV

ECOLOGY, MLT, MICROBIOLOGY& BIOCHEMISTRY Paper Code - 08UZO P04

Ecology:

1. Estimation of dissolved O2 content in given water sample (Winkler method)

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

3. Plankton study-identification and description of any five plankton

(marine)

Microbiology:

Examination of yeast, mould, protozoa and pathogenic bacteria.

Common culture media and its preparation.

MLT:

- 6. Estimation of urine sugar
- 7. Blood grouping
- 8. Hemoglobin estimation

Spotters

Description and uses of autoclave, Hot air oven, Incubator, Water bath, Centrifuge, Refrigerator ,pH meter, colorimeter, microtome,Rain gauge, anemometer, maximum minimum thermometer, hygrometer and barometer., Biostatistics –Problems on calculation of mean, median and mode. Computer applications- Hardware of computer, storage device, mouse

Field Report/ May be submitted

Practical Record submission

ALLIED ZOOLOGY

FIRST SEMESTER

Allied Paper I - INVERTEBRATE & CHORDATE ZOOLOGY Paper Code: 08UZO A01

UNIT I

Protozoa:

External Morphology of paramecium - Conjugation.

Porifera:

Cellular Structure of Leucosolinia.

Coelenterata:

External morphology of Aurelia and its life history

General Topic: Protozoan Parasites – Beneficial & Harmful

UNIT II

Platyhelminthes:

External structure of Fasciola Hepatica & Excretory system

Annelida

'Leech' – Digestive system and excretion.

General Topic: Human Helminth Parasite

UNIT III

Arthropoda

External Morphology of Penaeus

Mollusca:

External Structure of Fresh water mussel & Digestive system.

Echinodermata:

Star fish – External structure

General Topic: Water vascular system.

UNIT IV

Chordata: Hemichordata:

External Morphology of Amphioxus & Digestive system.

Pisces:

External morphology of 'Shark' – Digestive system of shark.

Amphibia:

Frog- External Structure & Respiratory system.

General Topic: Parental care in Amphibia.

Reptilia:

Identification of poisonous & Non poisonous snakes.

UNIT V

Aves:

Pigeon – Digestive System and Respiratory System.

General Topic: Flight adaptation of birds

Mammalia:

Rabbit – Digestive system & Structure of Brain.

SECOND SEMESTER ALLIED PAPER II Paper Code : 08UZO A02

UNIT : I

Cell Biology : Structure of Animal Cell - Structure and function of Plasma

Membrane & Mitochondria.

Genetics : Mendelian Laws of Inheritance.

UNIT : II

Developmental Biology : Types of Eggs - Fertilization and Cleavage.

Gastrulation in Frog.

UNIT : III

Physiology : Digestion & Excretion in man.

UNIT : IV

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

Noise)

UNIT : V

Evolution : Lamarkism and Neo Lamarkism, Darwinism and Neo

Darwinism

Text Books :

Bernice Anantharaj - Allied Zoology

ALLIED ZOOLOGY – PRACTICAL I Paper Code : 08UZO AP1

Time : 3 Hrs

Max Marks : 60

I. Major Practicals: (20 Marks)

- 1. Cockroach Digestive and Nervous system
- 2. Frog Digestive and Reproductive system

II. Minor Dissection and Mounting :

a) Earth worm - Body setae
b) Honey bee - Mouth parts
c) Mosquito - Mouth parts
d) Prawn - Appendages
e) Frog - Brain Mounting

III. Spotters :

(20 Marks)

(10 Marks)

a) Classify Giving Reasons

Amoeba, paramecium, Aurelia, Fascida hepatica, Ephyra larva, Taenia solium, Taenia scolex, Fascola hepatica. C.S., Ascaris – Male & Female, Amphioxus, Shark, Ichthyophis, Cobra, Sea anemme 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. Submision of Record

(10 Marks)

QUESTION PAPER PATTERN FOR THEORY

MAJOR AND ALLLIED

Each question paper consists of 3 parts - A, B & C

Time : 3 Hours

Max. Marks : 75

PART - A $10 \ge 2 = 20$

Answer All questions.

All questions carry equal marks.

PART - B $5 \ge 5 = 25$

Answer any 5 questions.

Either (or) Pattern.

PART - C $3 \ge 10 = 30$

Answer any 3 questions.

Open Choice Pattern

<u>QUESTION PAPER PATTERN FOR PRACTICALS</u> <u>MAJOR AND ALLIED</u>

Time	e : 3 hours	Max Marks : 60
Ι	Major practical	(20 Marks)
II	Minor practical	(10 Marks)
III	Spotters	(20 Marks)
IV	Record	(10 Marks)

LIST OF EXAMINERS :

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