POOMPUHAR COLEGE (AUTONOMUS)

(HR&CE Admin. Dept. Tamil Nadu)

MELAIYUR-609107

P.G. & Research Department of Zoology

B.Sc., Zoology-Course structure under CBCS

(Applicable to the candidates admitted from the academic year 2016 - 2017 onwards)

Semester	Subject	Hours	Credit	Exam	Marks		Total
					Internal	External	
I	Tamil I	6	3	3	25	75	100
	English	6	3	3	25	75	100
	First Allied I (Botany)	5	3	3	25	75	100
	First Allied II (Botany Practical)	3	-	-	-	-	-
	Core Major I (Invertebrate)	5	5	3	25	75	100
	Core Major II (Practical zoology)	3	-	-	-	-	-
	Value Education	2	2	3	25	75	100
		30	**16**				**500**
II	Tamil II	6	3	3	25	75	100
	English II	6	3	3	25	75	100
	First Allied II (Botany Practical)	3	4	3	40	60	100
	First Allied III (Botany Theory)	5	3	3	25	75	100
	Core –II (Practical zoology)	3	5	3	40	60	100
	Core -III (Chordate)	5	5	3	25	75	100
	Environmental studies	2	2	3	25	75	100
		30	**25**				**700**

III	Tamil III	6	3	3	25	75	100
	English III	6	3	3	25	75	100
	Second Allied- I (Chemistry)	5	3	3	25	75	100
	Second Allied- II (Chemistry practical)	3	-	-	-	-	-
	Core Course- IV -Cell & Molecular Biology	5	5	3	25	75	100
	Core Course- V Practical	3	-	-	-	-	-
	NME -I Communicable diseases and management	2	2	3	25	75	100
		30	**16**				**500**
IV	Tamil – IV	6	3	3	25	75	100
	English- IV	6	3	3	25	75	100
	Second Allied-II (Chemistry-Practical)	2	4	3	40	60	100
	Second Allied-III(Chemistry Theory)	5	3	3	25	75	100
	Core- V (Practical) (Cell & Molecular Biology and Physiology & Bio chemist)	2	5	3	40	60	100
	Core Course-VI Theory Physiology & Bio chemistry	5	5	3	25	75	100
	NME –II Health Education	2	2	3	25	75	100
	SBE –I Animal culture Technique	2	2	3	25	75	100
		30	**27**				**800**

V	Core -VII Genetics &Evolution	6	5	3	25	75	100
	Core - VIII Environmental Biology &Wild Life Conservation	6	5	3	25	75	100
	Core – IX Toxicology	5	5	3	25	75	100
	Core - X (P) Genetics &Evolution, Toxicology, Environmental Bio&Wild Life Conservation	4	5	3	40	60	100
	MBE- I Economic Entomology / Ethology	5	4	3	25	75	100
	SBE- II Bio-Instrumentation	2	2	3	25	75	100
	SBE- III Vector Biology& Parasitology	2	2	3	25	75	100
		30	**28**				**700**
VI	Core -XI Developmental Biology & Immunology	6	5	3	25	75	100
	Core –XII Micro Biology& Bio-Technology	6	5	3	25	75	100
	Core- Course XIII-(cc) Practical- IV covering XI&XII	5	5	3	40	60	100
	MBE-II Aquaculture / Apiculture	5	4	3	25	75	100
	MBE-III Option I - Poultry Science Option II - Biofertilizer and its application	5	5	3	25	75	100
	Soft Skills Development	2	2	3	25	75	100
	Gender Studies	1	1	3	25	75	100
	External Work	-	1	-	-	-	-
		30	**28**				**700**
	Total	**180**	**140**				**3900**

CORE COURSE– I

INVERTEBRATA

UNIT – I

Introduction to principles of Taxonomy; PhylumProtozoa**:** General characters andClassification up to class level. Detailed Study: Paramecium.GeneralTopics: Protozoan parasites, Plasmodium - life history,Pathogenesis and Control measures.

UNIT – II

Phylum Porifera: General character and classification up to class level. Detailed Study: Ascon sponge.General Topic:Canal system in sponges.

Phylum: Coelenterata: General characters and classification up to class level giving examples. Detailed Study: Obelia.General Topics:Corals & Coral reef – formations and types.

UNIT – III

Phylum Platyhelminthes: General characters and classification upto class level withExamples. Detailed study: *Taeniasolium*. General Topic: Parasitic adaptation inPlatyhelminths.

Phylum Nematoda: Detailed Study: Ascaris. General Topics:Nematode parasites: Life history, Pathogenicity and Control measures of *Wuchereriapancraft*.

UNIT – IV

Phylum Annelida: General characters and classification up to class level with examples.Detailed Study: Earthworm – (Morphology, Locomotion, Digestion, Nervous, Circulatory, Urinogenital and Reproductive system only). General topic: Nephridia.

PhylumArthropoda: General characters and classification up to class level with examples.Detailed Study: Prawn- Morphology, Locomotion, Digestion, Respiration, Nervous, Circulatory, Urinogenital and Reproductive system only.General Topics: Crustacean Larvae.

UNIT – V

Phylum Mollusca: General characters and classification up to class level.Detailed Study: Pila.General Topics: Torsion in Gastropada.

Phylum Echinodermata: General characters and classification up to class level. Detailed Study: Star fish.General Topic: Larval forms of Echinoderms. Water vascular system in starfish.

Reference Books:

1. Ekambaranatha Iyar and T.N.Ananthakrishnan. 1992. A Manual of Zoology,Vol.I(Invertebrata). Parts I & II.Viswanathan& Co.

2. Barrington, E.J.W.1979. Invertebrates.Structure and Function 2nd edn.ELBS and Nelson.

3. Jordon, E.L. and P.S.Verma. 1995 Invertebrate Zoology.12th edn.Sultan Chand & Co.

4. Barnes, R.D. Invertebrates. W.B.Saunders.

5. Kotpal, R.L., (All Series) Protozoa, Porifera, Coelenterata, Annelida, Arthropoda, Mollusca & Echinodermata - Rastogi Publications.

CORE COURSE - II --PRACTICAL –I

INVERTEBRATA & CHORDATA

INVERTEBRATA

Dissections:

1. Earthworm – Nervous systems, Digestive system.

2. Cockroach / Prawn – Nervous system, Digestive system.

Mountings:

1. Earthworm: Body setae, Penial setae.

2. Cockroach: Mouthparts.

3. Prawn: Appendages.

Spotters:

1. Protozoa: Paramecium, Conjugation, Binary fission, Euglena.

2. Porifera: Sponge gemmule, Sponge spicules, Sycon.

3. Coelenterata: Obelia entire, Physalia, Porpita, Sea anemone, Aurelia,Madrepora, Fungia.

4. Platyhelminthes: Liver fluke, Tapeworm, Tapeworm scolex, Palanaria.

5. Nematyhelminthes: Ascaris (Male and female), Filarial worm, Enterobias.

6. Annelida: Nereis, Nereisparabodium, Heteronereis, Cheatopterus, Sabella, Arenicola Leech, Trocophore larva.

7. Arthropoda: Prawn, Nauplius larva, Mysis larva,Crab, Limulus, Bombyxmori, Honey bee, Lac insect,Peripatus, Scorpion, Spider.

8. Mollusca: Pila, Radula, Pearl oyster, Sepia, Chiton, Dentalium,Octopus.

9. Echinodermata: Starfish, Pedicellaria, Sea urchin, Bipinnaria larva, Aristotle’s lantern, Sea urchin, Hiothurian, ophiuroid.

CHORDATA

Dissections:

Fish – Digestive system, Reproductive system.

Rat – Demonstration of Digestive, Arterial, and Venous & Reproductive Systems.

Mountings:

Placoid scales, Cycloid / Ctenoid scales.

Spotters:

1. Prochordata: Amphioxus, Ascidian BalanoglossusTornaria larva.
2. Pisces: Shark, Ray, Clarius, Echnies, Hippocampus, Exocoetus, Gambusia, Crap.
3. Amphibian: Alytes, Axolotl larva, Hyla, Salamander, Icthyophis.
4. Reptilia: Najanaja, viper, Draco, Chelonemydas.
5. Aves: Pigeon, quill feather.
6. Mammalian: Bat, Rabbit.
7. Dentition: Rabbit, Dog & Man.
8. Osteology: Pigeon – Synsacrum, Rabbit – pectoral & pelvic girdles, forelimb & Hind limb bones.

Students are introduced to learning of dissections / anatomy adapting CDS / Web sources.

CORE COURSE – III

CHORDATA

UNIT – I

General characters of Chordata and its outline classification.**Prochordata:** General characters and its outline classification.Detailed study: Ascidian.

UNIT – II

Vertebrata: General characters. **Cyclostomata :**Petromyzon. **Pisces**: GeneralCharacters and classification up to orders with common examples. Detailed study:Scoliodon. General Topics: Accessory respiratory organs in fishes. Migration of fishes.

UNIT – III

Amphibia: General characters and classification up to orders with common examples. Detailed study: Frog.Parental care in Amphibia,Neoteny in Salamanders.

Reptilia: General characters and classification up to orders. Type study: Calotes - digestive system, Respiratory system, Circulatory, Nervous system, Reproduction system. General Topics:Identification of poisonous and non-poisonous snakes of South India,Poison apparatus and biting mechanism, Nature of venom and antidotes.

UNIT – IV

Aves: General characters and classification up to sub orders with examples.Detailed Study: Pigeon. General Topics: Migration in birds, Flightadaptations in birds.

UNIT – V

Mammalia: General characters and classification up to orders with examples.Detailed Study: Rabbit.General Topic: Adaptations of Aquatic mammals. Dentition in mammals.

Reference Books:

1. Ekambaranatha Iyar, E.K.andT.N.Ananthakrishnan. 1992. A Manual ofZoology, Volume II Chordeta. Viswanathan& Co.

2. Dhami. D.S.andJ.K.Dhami. 1978 Chordate Zoology.R.Chand& Co.

3. Jordon, E.L. and P.S.Verma 1995. Chordate Zoology and Elements of AnimalPhysiology..S.Chand& co.

4. Muthukumarasami, P. and K. Palanivel.1990. ThandudaiyaVilangugal. BARD.

5. Thangamani T and N. Arumugam 1992 A Text Book of Chordates. SarasPublications.

CORE COURSE-IV

CELL AND MOLECULAR BIOLOGY

UNIT I

Microscopy – Principles, applications, components of compound and Eelectron microscope - SEM and TEM. Centrifugation – Differential and density gradient centrifuges: Principles, types andApplications. Cell types and their structure – viruses, prokaryotic and eukaryotic cells.

UNIT II

Plasma membrane – structure – models of Plasma membrane – Functions of Plasma membrane (osmosis, passive transport, active transport, endocytosis, exocytosis only), modifications of plasma membrane.Cytoplasm – Physical and biological properties. Endoplasmic reticulum: Ultrastructure,Types and functions.

UNIT III

Golgi complex – Morphology, structure, role in secretion and other functions.Lysosome and Centrosome – Morphology, chemistry and functions.Mitochondria – Ultra structure, oxidative phosphorylation, Kreb's cycle&fatty acid oxidation, Electron Transport system. Ribosome – Ultra structure and functions – Role in protein synthesis.

UNIT IV

Ultra structure and functions of Interphase nucleus and nucleolus; Chromosome – structure,type and Functions.Giant chromosomes.Cell divisions – Mitosis and Meiosis; Cell cycle.

UNIT V

Molecular structure and functions of DNA; DNA – Replication, repair mechanisms.RNA – Type. Transcription and Translation; Genetic code; Cancer Biology: Types, Carcinogens agent, Characteristic functions of cancer cells, prevention and Treatment of cancer.

Reference Books:

1. DeRoberties, E.D.P. and E.M.F. DeRobertis 1987. Cell and Molecular Biology

2. Power, C.B., 1989. Essentials of Cytology.Himalaya Publishing House.

3. Verma, P.S. and V.K.Agarwal. 1985. Cytology, S.Chand & Co.,

4. Powar, C.B. (1983), Cell Biology, Himalaya Publishing House, Bombay.

5. Tomar& Singh.(1999). Cell Biology.Rastogi Publication, Meerut.

CORE COURSE V – PRACTICAL – II

CELL AND MOLECULAR BIOLOGY, PHYSIOLOGY AND BIOCHEMISTRY

CELL AND MOLECULAR BIOLOGY

1. Onion root tip – squash preparation and study of mitosis

2. Grasshopper testis - squash preparation and study of meiosis

3. Chironomous larva - squash preparation of giant chromosome.

4. **Spotters:** Columnar, Ciliated, squamous epithelium, Cardiac, striated, Nonstraited Muscle, Nervecell, Blood of man and frog. Compound Microscope, Centrifuge, Micrometer, Camera lucida.

PHYSIOLOGY

1. Salivary amylase activity of human saliva in relation to temperature and pH.

2. Enumeration of RBC & WBC

3. Qualitative tests for Ammonia, Urea and Uric acid.

4. Spotters: Haemoglobinometer, kymograph, Sphygmomanometer.

5. Qualitative tests for proteins, carbohydrates and lipids.

BIOCHEMISTRY

1. pH measurement of various biological samples.

2. Spotters:

Models of Haemoglobin, Amino acids and ATP, Diet chart.

A record of lab work should be maintained and submitted at the time of the Practical examination.

CORE COURSE-VI

PHYSIOLOGY AND BIOCHEMISTRY

UNIT – I

Role of enzymes in Carbohydrate, protein and Lipid in digestion and absorption.

Nutrition: Types of digestion, structure of digestive system and associate digestive glands in man.

Respiration:Respiratory pigments – Bohr Effect. Transport of O_2 and CO_2 in man.

Circulation: blood composition – Blood grouping - types of heart – origin and conduction of heartbeat inMan – blood pressure –ECG.

UNIT – II

Excretion: structure of the mammalian kidney and urine Formation, types of Nitrogenous wastes – Osmo-ionic regulation in Fresh water, Marine, Estuarine and Terrestrial organisms (one Example for each)

UNIT – III

Muscle Physiology – types of Muscles – Ultra structure of skeletal muscle – chemistryand Energetic of Muscle contraction – physio-chemical characters domintof muscle contraction.

Nervous - Coordinating systems – neuron – types of neuron, conduction of nerve impulse synapse – synaptic transmission- reflex action.

UNIT – IV

Metabolism – Carbohydrate, Protein, Fats. CalorificValues – Balanced diet – source, function and malnutrition – sources and deficiency diseases of Vitamins.

UNIT – V

Enzymes: characteristics – classification - mode of action – Co-enzymes– mechanism of enzyme action - factors affecting enzyme action. Endocrinology: Endocrine glands in man – Secretions and disorders.

Reference:

1. Hoar, W.S. 1983. General and Comparative Physiology.Prentice Hall of India.

2. Nagabushanam R. 1991. Animal Physiology. S. Chand & Co.

3. Agarwal.R.A,A.K.Srivastava and Kaushal Kumar.2005. Animal Physiology and Biochemistry.S.Chand&Co. New Delhi.

4. Berry.A.K. A text book of Animal Physiology Emkay Publications, New Delhi-51.

5. Lehninger L. 1990. Biochemistry. W.H. Freeman & Co.,

6. Harper, H.A. 1993. Review of Physiological Chemistry.MuruzenAscian Ed.

CORE COURSE - VII

GENETICS AND EVOLUTION

UNIT – I

Linkage, crossing over and chromosomal mapping: Definition – Mechanism withDrosophila as example - Chromosome mapping – 3-point test cross – problems.Chromosome: Numerical changes: Aneuploidy, euploidy (haploidy and polyploidy).Human chromosome: Sex chromosome – Barr bodies – Chromosomal Abnormalities.

UNIT – II

Microbial genetics: DNA as the genetic material Recombination in bacteria:Transformation, conjugation,sexduction – Transduction – Recombination in Bacteriophage – Mechanism of recombination, lytic and lysogenic cycles.

UNIT – III

Molecular genetics: Fine structure of gene – Cistron, Recon and Muton - Gene expression and regulation in prokaryotes – Operon model – Lac and Trp Operon – Gene regulationin Eukaryotes - Histones, Gene amplification.

Gene mutations – spontaneous mutation: Base pair substitution, Frame shift mutation, and inducible mutations: suppressor mutations. Mutagens.

UNIT – IV

Chemical origin of life; Lamarckism; Darwinism; Devries theory of mutation; ModernSynthetic theory of evolution.

UNIT – V

Mimicry and animal coloration; Species concept; isolating mechanisms; Evolution ofHorse: Evolution of man.

Text Books:

1. Verma P .S. and Agarwal, V.K. 1997 – Genetics S.Chand& Co., New Delhi.

Reference:

1. Friefelder. D. 1997. Microbial Genetics; Narosa Publishing, New Delhi.

2. Goodenough, U.1997. Genetics.Saunders Coelege Publishing International, NewYork.

3. Kumar, H.D. 1998. Molecular Biology and Biotechnology.Vikas publishing House,New Delhi

4. Lewin, B. 1998. Gene V.I . Wiley Eastern Ltd., New Delhi.

5. Rothwell, N.V.1979. Human Genetics.Prentice Hall of India, New Delhi.

6. Verma, P.S. and V.K. Agarwal. 1997. Genetics. S.Chand& Co. New Delhi.

7. Gupta P.K. 1995-96 Genetics, Rastogi publication, Shivaji Road, Meerut 250 002.

8. Strickberger, M.W. 2002 Genetics (3rd edition). Prentice Hall of India, New Delhi.

9. Arumugam, N. 1989. Organic Evolution –.Saras publication, Nagercoil.

10.Strickberger, M.W. 2000. Evolution.Jones and Bartlett Publishers.

CORE COURSE - VIII

ENVIRONMENTAL BIOLOGY AND WILD LIFE CONSERVATION

UNIT – I

Ecology and Environmental Science – Definition - Scope – Branches – Abiotic factors – Water – Soil – Temperature – Light. Biogeochemical cycle – Nitrogen and phosphorus.

UNIT – II

Ecosystem : Definition Structure – Pond ecosystem – Primary production – SecondaryProduction –Food chain – Food web – Trophic levels – Energy flow – Pyramid of Biomass – Pyramid of energy. Animal relationship – Symbiosis –Commensalisms – Mutualism –Antagonism – Antibiosis – Parasitism – Predation –Competition.

UNIT – III

Population Ecology – Definition – Density – Estimation –Natality – Mortality – Age Distribution - Age pyramids – Population growth – Population equilibrium – Community Ecology: Characteristics, Ecological succession.

Pollution: Types – Sources – Effects – Air, Water, Land, Noise, Thermal, Pesticide – Radioactive – Green house effect - Ozone and its importance – Global warming – Acid Rain – Bioaccumulation – Bio magnification.

UNIT –IV

Wild life Biology:

Definition, Importance of Wildlife – IUCN Categories – Endangered animals of India – Asiatic Lion, Black buck, Rhinoceros, Swamp deer, Bustard, Jungle fowl, Turtles, Red data book, Human wildlife conflict – threats to wildlife.

UNIT – V

Wild Life Conservation: Insitu conservation (Sancturay, Nationl Park, Biosphere Reserves. Exsitu conservation (Zoo, Botanical garden seed banks). Conservation projects: project tiger, Elephant Project, Crocodile project. Wild life protection Act 1972. Organizations (Indian Board for Wildlife (IBWW), World Wildlife fund, India – (WWF) India) – protected

areas of Tamil Nadu (Point calimere, Vedanthangal, Wild Life sanctuary, National Park, Mudumalai WS, Anaimalai WS, Pichavaram Mangroves, Pulicot lake).

References:

1. Clarke, G.L. 1954 – Elements of Ecology, John Wiley & Sons. N.Y.

2. Kendeigh, S.C., 1961 – Animal Ecology, Prentice Hall.

3. Odum, E.P., 1971 – Fundamentals of Ecology., W.B. Saunders Company, Philadelphia.

4. Rastogi, V.B. and M.S. Jayaraj, 1989 – Animal Ecology and distribution of animals, KedarnathRamnath.

5. Sharma, P.D., 1990 – Ecology and Environment, Rastogi Publications, Meerut.

6. Southwick, C.H., 1976 – Ecology and Quality of Environment D. Van Nostrand Co.

7. Verma, P.S. and V.K. Agarwal, 1996 – Principles of Ecology, S.Chand& Co., New Delhi.

8. S.S. Purohit, D.H. Shanmi and A.K.Agarwal, 2004 – Environmental Sciences: A New Approach, Agrobix, Jodhpur.

9. BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad.

10.Krishnamurthy, K.V. 2003, Introduction to Biodiversity. Oxford and IBH.

CORE COURSE - IX

TOXICOLOGY

UNIT - I

INTRODUCTION TO TOXICOLOGY:

Definition, scope, Basic division and applications of toxicology.

UNIT- II

BASIC CONCEPT OF TOXICOLOGY:

ENVIRONMENT: Toxicants and Toxicity; factors that affect environmental concentrations of toxicants. Dose response relationship; (LC_{50}, LD_{50}).Acute toxicity, chronic toxicity.

UNIT - III

TOXICANTS (toxic agents) OF PUBLIC HEALTH HAZARDS:

Toxic chemicals, pesticides, automobile emission, heavy metals, types of food additives and functions.

UNIT- IV

BIO MAGNIFICATION OF TOXIC MATERIALS:

Mechanism of Biomagnifications- Biotransformation of Xenobiotics- types of Biotransformation. Mechanism of Biotransformation, significants of Biotransformation.

UNIT - V

BIOMONITORING OF TOXIC CHEMICALS:

Biomonitoring –Definition, methods - Bioindicators and environmental monitoring, Bioassay and applications.

REFERENCES:

1. Sharma, P.D. Environmental biology and toxicology, Rastogi publications.
2. Arumugam, N. Toxicology,Saras publication.
3. Lu, F.L. 1985. Basic Toxicology, Hemisphere Publications.
4. Gupta, P.K. & D.K. Saluka,1985. Modern Toxicology.

CORE COURSE-X PRACTICAL –III

GENETICSAND EVOLUTION, ENVIRONMENTAL BIOLOGY AND WILD LIFE CONSERVATION, TOXICOLOGY

GENETICS

1. Drosophila – male and female identification, Mutant forms (from pictures), Genetic Importance.

2. Observation and Recording of simple Mendelian traits in man.

3. Human Karyotypes: Normal, Down, Klinefelters and Turner's, syndrome.

EVOLUTION

1. Animals of evolutionary importance: Peripatus, Limulus, Archaeopterx.

2. Homologous organs: Forelimbs of Frog, Pigeon and Whale.

3. Analogous organs: Wings of Insects and Birds.

4. Fossils: Trilobite, Nautilus.

5. Mimicry: Leaf insects, Stick insects, and Monarch and Viceroy butterfly.

6. Colouration: Chameleon, Lycodon.

ECOLOGY

1. Estimation of dissolved oxygen.

2. Estimation of salinity.

3. Estimation of Hardness.

4. Mounting and identification of plankton (marine).

5. Spotters: Animal association, Intertidal fauna, Sacchi disc, Maximum and minimum Thermometer, Barometer, Luxmeter.

5. Visit to a local polluted area – Solid waste / sewage treatment plant / Wildlife Investigating area.

Spotters: Binocular, Lux meter, DO meter, camera, plankton net, Horn, Plastron, carapace, nests of birds.

6. Construction of a food web diagram based on a field visits.

WILDLIFE CONSERVATION

Field collection methods; Identification of common animals - Soil invertebrate diversity, Diversity of birds and mammals in parks / botanical gardens, threats to local Wild Life

- Field visit is compulsory.

TOXICOLOGY

1. Determination of LC_{50} value of any toxicant on fish.
2. Observation and recording of behavioural changes of normal and treated fish.
3. Estimation of O_2 consumption of normal and toxicant treated fishes.
4. Estimation of total protein content in the muscle tissue of normal and treated fish.
5. Estimation of glucose and glycogen level in the liver of normal and treated fish.
6. Histopathological observation of the following: liver, kidney& brain.

Reference:

Finney, D.J. 1971. ProbitAnal;ysis, Cambridge University Press.

CORE COURSE – XI

DEVELOPMENTAL BIOLOGY AND IMMUNOLOGY

UNIT I

Gametogenesis – Spermatogenesis – Cells in seminiferous tubules, spermiogenesis,Structure and types of sperm.

Oogenesis – Types of Chordate eggs - Growth of oocyte, vitellogenesis, organization of egg cytoplasm. Polarity and symmetry – Maturation of egg, egg envelops. Fertilization – External and internal fertilization, sperm – egg interaction.

Changes in the organization of egg cytoplasm, theories of fertilization.

UNIT II

Cleavage – Patterns of cleavage – radial, spiral and bilateral; Types – meroblastic,holoblastic and superficial Factors affecting cleavage; Chemodifferentiation.Blastulation – Types of blastula – Presumptive organ forming areas in frog and chick –Fate maps.Gastrulation – Gastrulation in frog and chick. Morphogenetic movements – Epiboly,emboly;Organogenesis – Development of eye. Organizer concept; embryonic induction.

UNIT III

Foetal membranes in chick; Placentation in mammals; Concept of test-tube baby; NuclearTransplantation; Factors involved in teratogenesis.

UNIT – IV

History and scope of immunology – Immunity: types, (Cell mediated and Humoral) innate and acquired, passive and Active. Lymphoid organs: primary and secondary (thymus, bone marrow, Bursa, spleen, Tonsil, lymph node, Payer's patches).

UNIT – V

Antigen – Factors influencing immunity – Epitopes - Immunoglobulins, structure, functions – Antigen – antibody reaction – Immunology of Infectious diseases, (AIDS) –

Transplantation immunity. A brief account of Humoral immune response – cell mediated immune response.

Reference Books:

1. Arumugam.N. 1998. Developmental Biology, Saras Publications, Nagercoil.

2. Balinsky, B.I. 1981. An Introduction to Embryology. W.B. Saunders Company. Philadelphia.

3. Berry.A.K.2007. An Introduction to Embryology, Emkay Publications, New Delhi-51.

4. Verma, P.S. and Agarwal V.K. 2005. Chordate Embryology (Developmental biology) S.Chand& Company Ltd., New Delhi.

5. Berry.A.K. 20005 ATextbook of Immunology, Emkay Publications, New Delhi-51.

6. Dulsy Fatima &N.Arumugam, 2000. Immunology, Saras Publications, Nagercoil.

7. Nandhini, S. (1994) – Immunology : Introductory Text Book, New Age Int (P) Ltd. Publications, New Delhi.

8. Chakravarthy, A.K. (1996) – Immunology, Tata McGraw Hill Publishing Co. Ltd., New Delhi.

9. Stites, D.P. and Abbas, I. (1991) – Basic and Clinical Immunology, Prentice Hall International Inc.

CORE COURSE – XII

MICROBIOLOGY AND BIOTECHNOLOGY

UNIT – I

Introduction - History and scope of microbiology – General structure of microbes(Bacteria, Viruses, Algae, Fungi and Protozoan) – Outline classification of each group and Identification – Bacterial growth, culture media, continuous and batch culture techniques, Bacterial growths curve.

UNIT – II

Food microbiology: Food poisoning, food spoilage, and food preservation.

Industrial Microbiology: Production of antibiotics with reference to Penicillin.

Soil microbiology: Role of soil microbes in Nitrogen fixation.

Medical Microbiology: Diseases caused by bacteria, cholera, tuberculosis, leprosy; Viruses, Jaundice, small pox, Poliomyelitis, causative organisms, symptoms, impact on the host and control measures.

UNIT – III

Biotechnology Definition and Scope. Recombinant Technology – Vectors - Plasmids PBR 322 - cosmids PJB 8 – SV40. Importance of Gene Bank. Isolation of Foreign DNA – Adapters and Linkers - Restriction enzymes– Colony Hybridization Technique – Southern blotting Technique - PCR Techniques.

UNIT – IV

Agricultural Biotechnology:

Transgenic plants: Methods – Disease resistant plants – Biopesticides, Biofertilizers – pesticides – Mycoherbicides.

Transgenic animals: Methods – Mice, Cattle, fish – IPR and IPP.

UNIT – V

DNA Finger printing – methodology and application – methods of gene therapy – Recombinant Vaccines – Monoclonal antibody – Gene Bank, SCP – Production of Human Hormones (Insulin).

Reference Books:

1. Ananthanarayanan, R and JayaramPanicker, C.K. (1999) – A Text Book of

Microbiology, Orient Longman.

2. Mani, A., Narayanan, L.M., Selvaraj, A.M. and Arumugam, N. (1996) –

Microbiology, Saras Publications.

3. Sharma, P.D. (1995) – Microbiology, Rastogi& Company, Meerut.

4. Balasubramania. D. 1996. Concepts of Biotechnology, University Press (India) Ltd.,

Hyderabad.

5. Dubey, R.C. 1995. Text Book of Biotechnology. S. Chand & Co.

6. Arumugam. Biotechnology.Saras Publications.

7. Vijayaraman, Chellammal K.S and Manikkili. P. 1998.UyiriyaeThozhilnutpam.

Chimeeraa, Trichy.

CORE COURSE-XIII PRACTICAL –IV

DEVELOPMENTALBIOLOGY, IMMUNOLOGY, MICROBIOLOGY & BIOTECHNOLOGY

DEVELOPMENTAL BIOLOGY

1. Observation of the structure of live spermatozoa of Calotes/Bull.

2. Observation of prepared micro slides to study.

   a. Egg, cleavage, blastula and yolk plug stage in frog.

   b. Egg, 24 hrs, 36 hrs, 48 hrs, 72 hrs and 96 hrs developmental stages in Chick.

IMMUNOLOGY

1. ABO Blood grouping and the Immunological basis of blood grouping and Rh blood typing and its Immunological significance.
2. Observation of lymphoid organs in rat.
3. **Spotters:**Immuno Electrophoresis, Rocket electrophoresis (from picture).

MICROBIOLOGY

1. Preparation of culture medium.

2. Fixing and staining of bacteria using simple stain.

3. Observation of bacteria structure in a smear using negative staining.

4. Differentiation of bacteria in a smear using Gram staining.

5. Serial dilution technique- Demonstration only.

5. **Spotters:**

   Autoclave, Petriplate, Micropipette, and Laminar flow, Inoculation loop.

BIOTECHNOLOGY

1. Isolation of DNA- Demonstration only.

2. Transgenic plants –Observation from pictures.

3. Transgenic animals –Observation from pictures.

4. **Spotters:**

Biogas unit.

A record of lab work should be maintained and submitted at the time of the Practical examination.

MAJOR BASED ELECTIVE – I

ECONOMIC ENTOMOLOGY

UNIT – I

Outline Classification of insectsupto orders – Morphology of insects, head, thorax and abdomen.

UNIT – II

HARMFUL INSECTS: Bionomics and life cycle of the common pests of paddy – Rice stem borer, Scirophagaincertulus, Rice gall midge, Orseoliaoryzoa. Coconut– Rhinozeros beetle. Vegetables – Stem borer, Euzophera, Perticella – Stored products (Internal Feeder: Rice Weevil, Sitophilusoxyzea, tobacco beetle, Lasiodermaserricorne) – (Spotted leaf beetle, Henosepilachnavigintiooctopunctata) – Pests of stored products.

UNIT – III

BENEFICIAL INSECTS

1. Economic importance of honeybee, silkworm and lac insect.
2. Insects as pollinators, predators, parasites, weed killers, soil builders and Scavengers.

UNIT – IV

HOUSEHOLD INSECT PESTS: Cockroach, Housefly, and Termites – damages caused and their control measures.

UNIT – V

INSECT PESTS MANAGEMENT: Insect pest control- Natural; mechanical,Cultural control, chemical control and Biological control. Integrated pest management.

References:

1. Chapman R.F., 1993. The Insects.Structure and Funcations.ELBS., London.

2. Chandler A.C. and Read C.P. 1961. Introduction to Parasitology. John Wiley And Sons, New York.

3. David, B.V., Muralirangan, N.C. and MeeraMuralirangan. 1992. Harmful and

Beneficial Insects.Popular Book Depot.

4. David, B.V. and T. Kumaraswami. 1998. Elements of Economic Entomology.

Popular Book Depot, Madras.

5. David, B.V. 1992. Pest management and pesticides: Indian Scenario, Namrutha

publications.

6. Krishnan, N.T., 1993. Economic Entomology.JJ.Publications, Madurai.

7. Mani, M.S., 1973. General Entomology. Oxford & IBH.

8. Nayar, K.K., Ananthakrishnan T.N. and David, V.D. 1990. General and applied

Entomology. Tata Mc Craw Hill, New Delhi.

9. RamakrishnanAyyar, T.V., 1984. Handbook of Economic Entomology for South

India. International Books and Periodicals Supply Service, New Delhi.

10. Shukla.G.S& V.B.Upadhyay,1998. Economic Zoology,Rastogi Publication, Meerut.

11. Vasantha Raj David, & V.V. Ramamurthy, 2011. Elements of Economic Entomology, NamruthaPublications, Chennai.

12. NalinaSundari&Shanthi, Economic Entomology.

MAJOR BASED ELECTIVE –II

AQUACULTURE

UNIT – I

Importance of aquaculture – Scope for Aquaculture - advantages of Aquaculture - production trends in the world and in India - over - exploitation of wild fish stocks.Basic Fish farm design: selection of site, grow - out and nursery ponds, Construction of ponds.

UNIT – II

Cultivable species of Algae, Fish, Crustaceans and Molluscs.Selection of Species for Aquaculture.Types of farming: extensive, intensive and semi intensive Culture. Integrated farming.Advantages of polyculture, monosex and monoculture.

UNIT – III

Culture of Carp species –Pearl culture: Prawn culture: the problems inPrawn culture, Socio-economic and environmental problems. FreshwaterPrawn culture.Potential for ornamental fish culture.Common species for ornamentalFish farming.

UNIT – IV

Fish disease management: Common bacterial, viral, fungal, protozoan and crustacean diseases, their symptoms and treatment. Water quality maintenance. Importance andComposition of feeds; types of feed: wet and dry feeds.

UNIT – V

Marketing the products: Marketing the fish to local markets and for export. Fishery by – product.Harvestingand transport. Quality control and norms of MPEDA.Preservation and processing methods. Nutritive values of fish food.

References:

1. Arumugam.N. 2008. Aquaculture Saras Publications, Nagercoil.

2. Rath, R.K. (2000) Freshwater Aquaculture. Scientific Publishers, (India), PO.

Box.91, Jodhpur.

3. Jhingran, AVG (1991) Fish and Fisheries of India. Hindustan Publishing Co.

4. Baradach, JE, JH Ryther and WO McLarney (1972) Aquaculture. The farming and Husbandry of Freshwater and Marine Organisms. Wiley Interscience, New York.

MAJOR BASED ELECTIVE –III

APICULTURE

UNIT – I

Honeybee – Diversity - Systematic position – Species of Honey bees – Life history of Honeybee – behaviour – swarming – Pheromone.

UNIT – II

Bee colony – Castes – natural colonies and their yield – Types of bee hives – Structure - Care and Management.Factors influencing distribution of colonies.

UNIT – III

Apiary – Care and Management – Artificial bee hives – types – construction of spaceFrames – Selection of sites – Handling – Maintenance – Instruments employed in Apiary- Extraction instruments.

UNIT – IV

Honey – Composition – uses – other products - Bee wax and its uses – yield in national and internationalMarket – Diseases of Honeybees and their control methods – Enemies of honey bee.

UNIT – V

Apiculture as Self - employment venture – Preparing proposals for financial assistanceand funding agencies – Economics of bee culture – current status of Apiculture in India

Reference:

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, Controller Printing and Stationery, Chandigar.

5. Rare, S. 1998 – Introduction to bee keeping, Vikas Publishing house.

6. Shukula,G.S. and Upadhyay V.B. (1997) Economic Zoology, RastogiPublications,Meerut.

NON MAJOR ELECTIVE - I

COMMUNICABLE DISEASES AND MANAGEMENT

UNIT – I

Air borne diseases: Influenza-Measles-Mumps-Small pox- Tuberculosis-Diphtheria-Meningitis-Whooping cough -Treatment – Prophylaxis -Control measures, Swine flu.

UNIT – II

Food and water borne diseases: Polio – Cholera – Botulism – typhoid – Amoebosis-Tetanus- Anthrax – Treatment – Prophylaxis- Control measures.

UNIT – III

Insect borne diseases: Yellow fever- Dengue fever – Malaria –Filariasis-SleepingSickness – Treatment- Prophylaxis management - Control measures.

UNIT – IV

Sexually transmitted diseases: Gonorrhea –Chancroid – Vaginitis- Syphilis. Treatment – Prophylaxis.

UNIT – V

Direct contact disease: Viral hepatitis- Rabies- Cold sores- AIDS. Treatment – Prophylaxis.

References:

1. M.J.Pelezar and R.D.Reid, Microbiology – McGraw Hill Pub.

2. Larry McKane and Judy Kandel .Microbiology – McGraw Hill Publ. New York.

3. R.C.Dubey and D.K.Maheshwari. A Text Book of Microbiology – S.Cand& co. Ltd.

New Delhi.

4. Mani.A, A.M.Selvaraj,L.Narayanan, N.Arumugam. Microbiology – Saras Publ.

Nagercoil.

5. Shukla.G.S and V.B.Upadhyay. Economic Zoology.Rastogi publ. Meerut.

NON MAJOR ELECTIVE - II

VECTOR BIOLOGY

UNIT – I

Mosquitoes – Morphology, Life cycle difference between Anopheles, Culex. Public health importance – control measures.

UNIT – II

Housefly – Morphology, Life Cycle – Public health importance – control measure.

UNIT – III

Lice – Morphology, Life cycle – public health importance – control measure.

UNIT – IV

Sand fly – Morphology, Life cycle – public health importance – control measure.

UNIT – V

Ticks ad Mites – Morphology, Life cycle – Public health importance – control measure.

Reference Books:

1. Mike. W. Sennia, 2010. Medical Entomology for students Cambridge university press.
2. Rathinaswamy, G.K. 2006. A hand book of medical entomology & Elementary parasitology. S. Viswanathan, printers. Chennai.

Reference:

1. Gopalan C., B.S.Ramasastri, and S.C.Balasubramanian. 1971. Nutritive value of

Indian foods.National Institute of Nutrition, Hyderabad.

2. Gopalan, D. and K.Vijayaragavan. 1971, Nutrition atlas of India.ICMR., New Delhi.

3. Ghosh,S. 1981. The feeding care of infants and young children. UNICEF, New Delhi.

4. Mudambi, S.R. 1995. Fundamentals of Food and nutrition. New age International,

New Delhi.

5. Swaminathan, M., 1989. Handbook of food and nutrition.Bappco., Bangalore.

6. Swaminathan, M., 1974. Essentials of food and nutrition.Vol.I and II. Ganesh and company, Madras.

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SKILL BASED ELECTIVE - II

BIOINSTRUMENTATION

UNIT – I

Principle, and applications of Balances (Physical, Digital, Monobalance), Centrifuge – Colorimeter, pH, Autoclave and Hot air oven.

UNIT – II

Incubator, Water bath, Refrigerator, Sterilization techniques, Preparation and use of Glassware's – selection and cleaning of Glassware, syringes and needles.

UNIT – III

Electrophoresis: Paper and Gel – Principles and application. Chromatography: Paper-TLC – GLC – principles and applications.

References:

1. Instrumental methods of clinical analysis, ChatwalAnand, 2003.
2. Biophysical Chemistry, UpadhayayNath, 2001.
3. Biophysical Chemistry, R.N.Roy, 2005.
4. Turk and Turk 1995. Ewt. Science, Samders Company.
5. Park and Park 2985. Social and preventive medicine, East West Publications, New Delhi.
6. Application of World Health Organization on Health and Diseases.

SKILL BASED ELECTIVE – III

VECTOR BIOLOGY AND PARASITOLOGY

UNIT – I

Protozoan and Human diseases, life cycle and Public health importance of Trypanosomiasis and Leishmeniasis.

UNIT – II

Platyhelminthes and human diseases, life cycle and public health importance of Taeniasolium and Ascaris.

UNIT – III

Mosquitoes – Biology, Morphology, Life cycle difference between culex, Anopheles – public health importance – control measures.

Housefly – Biology, Morphology, Life Cycle — Public health importance – control measures.

References:

1. Mike. W. Service – 2010. Medical entomology for students Cambridge University Press.
2. Rathinaswamy. G. K. 2006. A hand book of medical entomology and Elementary parasitology. S. Viswanathan printers Chennai.

SKILL BASED ELECTIVE - I

ANIMAL CULTURE TECHNIQUES

UNIT – I

Types of worms – Method of composting – factors responsible for composting – vermicomposting – biofertilizer.

UNIT – II

Types of honey bee – bee colony - social life in honey bees-types of beehive and other accessories – use of honey.

UNIT –III

Silk worm, Bombyxmori – cultivation of mulberry plants – rearing of silk worms – silk production – composition and uses of silk.

UNIT – IV

Fisheries in India– general culture techniques – induced breeding – culture of edible fishes verities.

UNIT – V

Ornamental Fish Culture – Angel fish – fighter fish – Gold Fish – Gurami and Guppies.

Text Book:

1. Vasantharaj David. B. and Kumaraswamy. T, 1988. Elements of Economic Entomology. Popular Book Depot. Madras.
2. Pillay. T.V.R. 1995. Aquaculture, Principles and Practices Fishing. New Books survey. England.

Reference Books:

1. Biswas, T.D. and S. Kmukhrjee, Text book of soil science. Tata. McGraw Hill, 1994. New Delhi.
2. Agarwal S.C. 1994. A hand book of fish farming. Narendra publishing house, Delhi.

3. Axalrod. H. Immeris, C.W. Burgens, W.S. 1996. Exoitic. Tropical fishes. T.F.H. Publications U.S.A.

ALLIED ZOOLOGY

ALLIED COURSE – I

BIOLOGY OF INVERTEBRATES AND CHORDATES

UNIT – I

Classification of major Invertebrate phyla and Chordata upto classes with characteristics, and diversity with suitable examples.

UNIT – II

Detailed study of Paramecium, Obelia, Fasciola Hepatica and Earthworm (Morphology, Digestive, Circulatory, Respiratory, Nervous, Excretory and Reproductive systems only).

UNIR – III

Detailed study of Prawn, Lamellidens and Sea star.

UNIT – IV

Detailed study of external features, digestive system, Respiratory system, circulatory system, Urinogenital system of Shark, Frog and Calotes.

UNIT – V

Detailed study of external features, digestive system, respiratory system, circulatory system, urinogenital system of Pigeon and Rabbit.

Reference:

1. Outlines of Zoology – M. ErambaranathaAyyar – Viswanathan Publications.
2. A Manual of Zoology, Vol. 1 & 2 M.E.K.Ayyar – ViswanathanPublicattions.
3. Invertebrate Zoology – E.L. Jordan – S. Chand and Co.
4. Chordate Zoology – E.L. Jordan – S. Chand and Co.

ALLIED COURSE – III

ECONOMIC ZOOLOGY

UNIT- I

Vermiculture and composting – types of earthworm – rearing technology – management – economic importance – composting.

UNIT – II

Apiculture – species of honey bees – Types of bee hives – Care and management – honey extraction – Nutritive and medicinal values of honey – other products through Apiculture.

UNIT – III

Sericulture – Food and Feeding habits of Larvae – Life cycle of Silk worm (Bombyxmori) – Economic importance of silk worm ad silk – types of silk.

UNIT – IV

Aquaculture – construction of aqua pond – management of a pond – freshwater cultivable fishes – fish feed – induced breeding – prawn culture – Fish diseases. (Fumunculosis, Epizootic ulcerative syndrome (EUS) and Vibriosis.

UNIT – V

Poultry farming – types of poultry – management – Poultry nutrition – diseases and their prevention – Economic of poultry – Economic of Poultry production.

Reference :

1. G.S.Shukla and V.B.Upadhyay – Economic Zoology, Rastogi publications.
2. J. Ahsan and S.P.Sinha – A hand book of Economic Zoology – S. Chand & Co.,
3. Sardar Singh – Bee Keeping in India.
4. Santhanam – Aquaculture.
5. Ullal, S.R. and M.N.arasimhanna – Central Silk Board, Government of India, Bombay.

6. Singh – Livestock and Poultry Production.
7. ManjuYada, 2003. Economic Zoology, Discovery publication House, New Delhi.
8. Rose. S. P. Principles of Poultry Science, C&B International.

ALLIED ZOOLOGY PRACTICAL

ALLIED COURSE – II

1. **Dissections:**

   Earthworm : Nervous system

   Cock roach : Digestive system, Nervous system.

   Any Carp (Bony fish) : General Anatomy.

2. Mountings:

   Earthworm - Body and Penial setae.

   Cockroach and Honey bee – Mouth Parts.

   Shark – Placoid scale.

   Any carp – Cycloid or Ctenoid scale.

3. Spotters : Amoeba, Paramecium, Trupanosoma, Plasmodium, a simple sponge, Obelia colony, Sea anemone, Ascaris, Fasiola hepatica, Taeniasolium, Planaria, Earthworm, Nereis, Leech, Prawn, Scorpion, Grass hopper, Fresh water Mussel, Pila, Starfish, Amphioxus, Shark, Catla, Frog, Salamander, Calotes, Turtle, Snake, Pigeon, Rat & Bat.
4. Species of animals used in vermiculture, apiculture, lac culture, sericulture, aquaculture and poultry farming.
5. Products: Honey Bee's Wax, Lac, Silk, Cod liver oil, Pearl, eggs of different poultry birds, leather, wool.
6. Brain of frog & Calotes (Demonstration).

ENVIRONMENTAL STUDIES

UNIT – I

Environmental pollution causes effects & control measures of Air, Water, Soil, Noise, Thermal pollution & nuclear hazards.

UNIT – II

Concept of Ecosystem - Disaster management floods – earthquake, cyclone & landslides.

UNIT – III

Need for awareness. Natural Resources of associate problems.

(a) Forest resources – use of over exploitation deforestation – mining – dams.
(b) Water resources – use of over utilization – surface & ground water – dams – benefits of problems.

Food resource – modern Agriculture – over grazing – fertilizer – pesticide problems.

Energy resources: use of Alternate energy sources.

Land resources – land degradation – soil erosion - desertification.

References:

1. Clarke, G.L. 1954 – Elements of Ecology, John Wiley & Sons. N.Y.

2. Kendeigh, S.C., 1961 – Animal Ecology, Prentice Hall.

3. Odum, E.P., 1971 – Fundamentals of Ecology., W.B. Saunders Company,

Philadelphia.

MAJOR BASED ELECTIVE –III

BIOFERTILIZERS AND ITS APPLICATION

UNIT – I

Scope of Biofertilizers – types of soil – physical and chemical composition of soil.Types of microorganisms in soil, Biology of Earthworm (Lampitomoruitti) feeding habits and food for composting worms.

UNIT – II

Production of bacterial biofertilizers – Cyanobacteria, Mass cultivation of *Azolla* and its utilization. Isolation and identification of nitrogen fixing Bacteria.*Rhizobium* and legume root nodulation and nitrification process.

UNIT – III

Vermicomposting methods such as – small scale and large scale pit, heap, window methods etc.Factors affecting vermicomposting such as pH,moisture, temperature, etc.

UNIT – IV

Vermicomposting: General procedure in homes. Maintenance of vermicomposting beds.Harvesting the worms.Earthworm predators, parasites and pathogens.

UNIT – V

Use of composite biofertilizers and vermicomposting – Methods for enhancing soil fertility.Renewable properties of biofertilizers. Application of biofertilizers and vermicomposting in agriculture and horticulture practices.

References:

1. Singh,T. and Purohit,S.S. 2008: Bio fertilizer technology, Agrobio – India

2. Sharma,A.K. 2007 : Bio fertilizer for sustainable Agriculture – Agrobio – India

3. Pandiyarajan,P. 2008 : Techniques in Agricultural Microbiology- Agrobio – India

4. Purohit, S.S. 2005 : Microbiology – Fundamentals and Applications (6th Edition) Student Edition – Jodhpur – India.

5. Dubey,R.C., and Maheswari, D.K. 2007 : A Text Book of Microbiology – S. Chand & Co., New Delhi, India.

6. Edwards, C.A., and Bother, B. 1996 : Biology of Earthworms – Chapman Hall Publ. Co., London.

7. Ismail, S.A. 1997 :Vermitechnology – The Biology of Earthworms- Orient Longman Publ. – India.

8. Talashikar, S.C. 2008 : Earthworms in Agriculture – Agrobios – India

MAJOR BASED ELECTIVE –III

POULTRY SCIENCE

UNIT – I

Classification of fowls based on their uses: Meat types - Broilers, Egg types - White Leghorn and Commercial layers, Dual purpose varieties, Game and Ornamental purpose varieties.

UNIT – II

Management of Egg Layers – Management of Broilers in large scale farms.Rearing of fowls – methods of rearing chicken, growers, layers and broilers – growth. Management – summer and winter management - States of poultry in India.

UNIT – III

Food & Poultry nutrition – composition of feeds – nutritional requirements of fowls – nutritional deficiency and symptoms of diseases.

UNIT – IV

Poultry diseases - viral, bacterial, fungal, protozoan climatic factor and parasitic lice etc.Prevention and precautions during vaccination.

UNIT – V

Management of modern poultry farms – Progressive plans to promote poultry as a self-employment venture – Export strategy.

Reference:

1. Jull Morley, A. 1971 : Poultry Husbandry, Tata-McGraw Hill Publ. Co., New Delhi-India.

2. Sastry, Thomas and Singh, 1982 : Farm Animals Management and Poultry Production-Vikas Publ. Co., New Delhi – India

3. Harbans Singh and Earl. N. Moore, 1982 : Live Stock and Poultry Production, Prentice Hall

India Publ. Co., New Delhi - India

4. Banarjee, G.C. 1986 : Poultry, Oxford – IBH Publ. Co., New Delhi – India.

5. Gnaanamani, M.R. Poultry keeping.

6. The rearing of pullets – Bulletin No. 54, Her majestry`s stationary office, London.

7. Intensive poultry management for egg production. Bulletin No. 152. Her majestry`s stationary office, London.

8. Scott, M.L. *et al*., Nutrition of the chicken.

9. Biester, Diseases of poultry. Oxford & IBH.

NON MAJOR ELECTIVE

HEALTH EDUCATION

UNIT – I

Health: Definition – dimensions of health – Health education: definition – objectives – principles – Nutrition and health: Balanced diet – food hygiene. Food poisoning, food spoilage, food infection, food preservation – prevention methods.

UNIT – II

Non – communicable diseases and their preventive measures such asCoronary Heart Diseases, Hypertension, , Stroke, Diabetes, Obesity and Mental ill – Health. Drug – Drug addicts.

UNIT – III

Cancer Biology: Definition - Scope – Types – Causing agent prevention and Control measures.

Family Planning: Definition – Scope – Contraceptive devices.

Reference book:

1. E. Park: Textbook of Preventive and Social Medicine, BanarsidosBhanot, 1278 Napier Town.
2. Verma, S. 1998: Medical Zoology, RastogiPubl, Meerut, India.
3. Singh, H.S. and Rastogi, P. 2009: Parasitology, Rastogi Publ. India.