

ALLUVAR UNIVERSITY

BACHELOR OF SCIENCE

B.Sc. ZOOLOGY

DEGREE COURSE

CBCS PATTERN

(With effect from 2012 - 2013)

The Course of Study and the Scheme of Examinations

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
SEMESTER I									
1	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2	II	English	Paper-1	6	4	English	25	75	100
3	III	Core Theory	Paper-1	6	6	Invertebrata	25	75	100
	III	Core Practical	Practical-1	3	0	Invertebrata and Chordata	0	0	0
4	III	Allied-1	Paper-1	4	4	One out of 3 1. Chemistry – I 2. Botany – I 3. Economic Entomology – I	15	60	75
	III	Allied Practical	Practical-1	3	0		0	0	0
5	IV	Environmental Studies		2	2	Environmental Studies	10	40	50
				30	20		100	325	425
SEMESTER II									
6	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
7	II	English	Paper-2	4	4	English	25	75	100
8	III	Core Theory	Paper-2	6	5	Chordata	25	75	100
9	III	Core Practical	Practical-1	3	3	Invertebrata and Chordata	40	60	100
10	III	Allied-1	Paper-2	4	4	One out 3 1. Chemistry – II 2. Botany – II 3. Economic Entomology – II	15	60	75
11	III	Allied Practical	Practical-1	3	2		10	40	50

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				hrs week	Credit	Title of the Paper	Maximum Marks		
12	IV	Value Education		2	2	Value Education	10	40	50
13	IV	Soft Skill		2	1	Soft Skills	10	40	50
				30	25		160	465	625
SEMESTER III									
							CIA	Uni. Exam	Total
14	I	Language	Paper-3	6	4	Tamil / Other Languages	25	75	100
15	II	English	Paper-3	6	4	English	25	75	100
16	III	Core Theory	Paper-3	3	3	Cell and Molecular Biology	25	75	100
17	III	Core Practical	Practical-2	3	0	Cell and Molecular Biology, Genetics and Biotechnology	0	0	0
18	III	Allied-2	Paper-3	4	4	One out of 3 1. Chemistry – I 2. Botany – I 3. Economic Entomology – I	15	60	75
	III	Allied Practical	Practical-2	3	0		0	0	0
19	IV	Skill Based Subject	Paper-1	3	3	To choose one out of 2 A. Public Health and Hygiene B. Single cell protein culture	15	60	75
20	IV	Non-Major Elective	Paper-1	2	2	To choose one out of 2 A. Vermiculture B. Poultry farming	10	40	50
				30	20		115	385	500
SEMESTER IV									
							CIA	Uni. Exam	Total
21	I	Language	Paper-4	6	4	Tamil/Other Languages	25	75	100
22	II	English	Paper-4	6	4	English	25	75	100
23	III	Core Theory	Paper-4	3	3	Genetics and Biotechnology	25	75	100
24	III	Core Practical	Practical-2	3	3	Cell and Molecular Biology, Genetics and Biotechnology	40	60	100
25	III	Allied-2	Paper-4	4	4	One out of 3 1. Chemistry – II 2. Botany – II 3. Economic Entomology – II	15	60	75
26	III	Allied Practical	Practical-2	3	2		10	40	50

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				hrs week	Credit	Title of the Paper	Maximum Marks		
27	IV	Skill Based Subject	Paper-2	3	3	To choose one out of 2 A. Bio fertilizer production B. Apiculture	15	60	75
28	IV	Non-Major Elective	Paper-2	2	2	To choose one out of 2 A. Sericulture B. Aquarium fish keeping	10	40	50
				30	25		165	485	650
SEMESTER V							CIA	Uni. Exam	Total
29	III	Core Theory	Paper-5	6	5	Biostatistics and Bioinformatics	25	75	100
30	III	Core Theory	Paper-6	6	5	Developmental Biology and Immunology	25	75	100
31	III	Core Theory	Paper-7	6	5	Animal Physiology	25	75	100
32	III	Core Practical	Practical-3	3	0	Animal Physiology and Developmental Biology and Immunology	0	0	0
33	III	Core Practical	Practical-4	3	0	Environmental Biology and Economic Zoology	0	0	0
34	III	Elective I	Paper-1	3	3	To choose one out of 2 A. Bio-instrumentation B. Human Endocrinology	25	75	100
35	IV	Skill Based Subject III	Paper - 3	3	3	To choose 1 out of 2 A. Pisciculture B. Vegetable meat culture	15	60	75
				30	21		115	360	475
SEMESTER VI							CIA	Uni. Exam	Total
36	III	Core Theory	Paper-8	5	5	Environmental Biology	25	75	100
37	III	Core Theory	Paper-9	5	4	Economic Zoology	25	75	100
38		Core Theory	Paper-10	5	4	Evolution	25	75	100
39	III	Core Practical	Practical-3	3	3	Animal Physiology and Developmental Biology and Immunology	40	60	100
40	III	Core Practical	Practical-4	3	3	Environmental Biology and Economic Zoology	40	60	100
41	III	Elective	Paper-2	3	3	To choose one out of 2 A. Biochemistry B. Applied Entomology	25	75	100

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				hrs week	Credit	Title of the Paper	Maximum Marks		
42	III	Elective	Paper-3	3	3	To choose one out of 2 A. Nanotechnology in life sciences B. Microbiology	25	75	100
43	IV	Skill based Subject	Paper-4	3	3	To choose one out of 2 A. Medical Lab Techniques B. Industrial fishery management	15	60	75
44	V	Extension Activities		0	1		10	40	50
		TOTAL		30	29		230	595	825

Part	Subject	Papers	Credit	Total credits	Marks	Total Marks
Part I	Languages	4	4	16	100	400
Part II	English	4	4	16	100	400
Part III	Allied (Odd Semester)	2	4	8	75	150
	Allied (Even Semester)	2	4	8	75	150
	Allied Practical	2	2	4	50	100
	Electives	3	3	9	100	300
	Core Theory	10	(3-7)	45	100	1000
	Core Practical	4	3	12	100	400
Part IV	Environmental Science	1	2	2	50	50
	Soft skill	1	1	1	50	50
	Value Education	1	2	2	50	50
	Lang. & Others/NME	2	2	4	50	100
	Skill Based	4	3	12	75	300
Part V	Extension	1	1	1	50	50
	Total	41		140		3500

ALLUVAR UNIVERSITY

BACHELOR OF SCIENCE

B.SC. ZOOLOGY

SYLLABUS

UNDER CBCS

(with effect from 2012 - 2013)

SEMESTER I

PAPER – 1

INVERTEBRATA

Objective:

To understand the systematic and functional morphology of various groups of invertebrates.
To study their economic importance, affinities and adaptations.

UNIT – I

Principles of Taxonomy – Binomial nomenclature – classification of the animal kingdom.

PROTOZOA: General characters and classification up to class with examples.

Type study plasmodium, parasitic protozoans [Entamoeba, Trypanosoma and Leishmania]

UNIT – II

PORIFERA: General characters and classification up to classes with examples.

Type study - sycon, canal system in sponges.

COELENTERATA: General characters and classification up to classes with examples.

Type study – Obelia, polymorphism in coelenterates.

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HELMINTHES: General characters and classification up to classes with examples.

Type study – Taenia solium. Nematode parasites and diseases – Wuchereria bancrofti, Enterobius vermicularis, Ancylostoma duodenale.

ANNELIDA: General characters and classification up to classes with examples.

Type study: Nereis, metamerism in Annelids.

UNIT – IV

ARTHROPODA: General characters and classification up to classes with examples.

Type study – Prawn, Peripatus and its affinities, Mouth parts of insects.

UNIT – V

MOLLUSCA: General characters and classification up to classes with examples.

Type study – Fresh water Mussel.

ECHINODERMATA: General characters and classification up to classes with examples.

Type Study- Sea star, Echinoderm larvae and their significance.

Reference Books:

Ekambaranatha Ayyar.M. and T.N. Ananthakrishnan, 1992. Manual of Zoology Vol.1 [Invertebrata], Viswanathan [Printers and Publishers] Pvt. Ltd.; Madras.

Jordan, E.L. and P.S.Verma, 1993. Invertebrate Zoology, 12th Edition. S.Chand and Co.Ltd., New Delhi.

Kotpal, R.L. 1988-1992 Protozoa, Porifera, Coelenterata, Helminthes, Annelida, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.

Parker and Haswell, 1964. Test Book of Zoology. Vol.1 [Invertebrata]. A.Z.T; B.S.Publishers and distributors, New Delhi.

L.A Borradi and F.A.Pott. The Invertebrates. Cambridge University Press. UK.

Adam Sedgwick. 1972 A student text book of Zoology. Vol.I and II. Central book Depot. Allahabad.

P.S.Dhami and J.K.Dhami. Invertebrate Zoology, S.Chand and Co. New Delhi.

Hyman L.H. The Invertebrate Vol.I-IV. 1955, McGraw Hill Co. New York.

Barrington, E.J.W. 1969. Invertebrate structure and function. ELBS Publication.

Barnes. Invertebrate Zoology. Toppan International Co.

SEMESTER II

PAPER – 2

CHORDATA

Objectives:

To understand the systematic and functional morphology of various groups of chordates.
To study their affinities and adaptations to different modes of life.

UNIT – I

Salient Features and General classification of Phylum chordata upto orders.

Origin of Chordata.

Prochordata: General Characters and affinities of Hemichordata, Cephalochordata & Urochordata.

UNIT –II

PISCES

General characters and classification up to orders.

Type study: Shark.

Parental care in fishes.

AMPHIBIA

General characters and classification up to orders.

Type study : Frog

Adaptive features of Anura, urodela & Apoda.

Parental care in Amphibia

UNIT – III

REPTILIA

General characters and classification upto orders.

Type study – Calotes.

Poison apparatus and biting mechanism of poisonous snakes.

Identification of poisonous and non – poisonous snakes.

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AVES

General characters and classification upto orders.

Type study –pigeon

Characters of Archaeopteryx

Ratitae.

Flight adaptation.

UNIT – V

MAMMALIA

General characters and classification upto orders.

Type study – Rabbit

Flying mammals.

Dentition in mammals.

Aquatic mammals.

Reference Books:

Ekambaranatha Ayyar, M and T.N Anantha Krishnan 1992, A manual of zoology Vol. II [Chordata].

S. Viswanathan [Printers and publishers] Pvt. Ltd., Madras.

Jordan E. L. and P.S. Verma 1995. Chordate Zoology and elements of Animal Physiology. S. Chand and co., New Delhi.

Kotpal R.L. 1992. Vertebrata, Rastogi publication, Meerut.

Nigam. H.C 1983 Zoology of chordates, Vishal publications, Jalandhar.

Waterman, Allyn J. et al. 1971, Chordate Structure and functions, Mac. Millan and co., New York.

Jollie. M. 1968. Chordate Morphology. East west press Pvt. Ltd., New Delhi.

Hyman. L.H. Comparative vertebrate zoology. McGraw Hill co. New York.

CORE PRACTICAL – I

INVERTEBRATA AND CHORDATA

DISSECTIONS

Cockroach – Digestive and Nervous system

Prawn – Nervous system

Shark – Arterial system (Demonstration Only)

MINOR PARCTICAL

MOUNTING

Mouth parts : Cockroach, Honey bee, House Fly and Mosquito

Prawn – Appendages

Shark - Placoid scales

SPOTTERS

Study of the following specimens to bring out and their adaptations to their respective modes of life.

Entamoeba, Trypanosoma, Leishmania, Sycon, Taenia solium, Ancylostoma duodenale, Enterobius Vermicularis, Ascaris, Wuchereria bancrofti, chaetopterus, Leech, Limulus, Any two Crustacean Larvae, Starfish, Balanoglossus, Ascidian, Ichthyophis, Draco, Phrynosoma, sea snake and Bat.

Study of the following specimens to bring out their biological significance:

Obelia, Corals [Any 3], physalia, porpita, vellela, Trochophore Larva, Peripatus, Sacculina On Crab, Sea Anemone on Hermit Crab, Pearl Oyster, Bipinnaria Larva, Amphioxus, Epiceratodus, Shark, Anabas, Hippocampus, Narcine, Echeneis, Arius, Flying Fish Eel, Amblystoma, Axolotl Larva, Bufo, Hyla, Cobra, Krait, Russels Viper, Echis Carinata, Python, Typhlops, Turtle, Crocodile, Parrot, Pigeon, Owl, Woodpecker, King Fisher.

Study of the following to relate structure and function:

Sponge Spicules, Obelia Polyp, Taenia Scolex, Nereis - Parapodium, Prawn appendages, Pedicellaria of Star fish, Placoid Scale of Shark, Quill Feather of pigeon.

Study of the following to draw labeled sketches:

T.S. of Nereis, T.S. of Leech, Obelia medusa, T.S. of Amphioxus through Pharynx, T.S. thro arm of Sea star.

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Study of the following skulls with reference to dentition – Cat Or Dog, Rat or Rabbit, Man

Pectoral girdles of Frog, Calotes, Pigeon, Rabbit/ Rat.

Pelvic Girdles of Frog, Calotes, Pigeon, Rabbit/ Rat.

Fore limbs of Frog, calotes, pigeon, Rabbit/Rat.

Hind limbs of Frog, Calotes, Pigeon, Rabbit/Rat.

Synsacrum of Pigeon.

Reference Books:

Verma. P.S. 2011 A Manual of Practical Zoology INVERTEBRATES Chand & Co, Ltd, Ram Nagar - New Delhi.

Verma. P.S. 2011 A Manual of Practical Zoology CHORDATES, Chand & co, Ltd. Ram Nagar – New Delhi.

Jayanpa Sinha . 2010 Advanced Practical Zoology, Books & Allied (p) Ltd. No.1. Subham Plaza I Floor, Calcutta.

SEMESTER III

PAPER – 3

CELL AND MOLECULAR BIOLOGY

Objectives:

To learn the cytological techniques, the structure and functions of various cellular components.

To understand the integrated activity of the whole cell as in mitosis, meiosis and protein synthesis.

To understand the molecular basis of cell structure DNA structure and functions.

UNIT – I

History of Cell and Molecular Biology – Principles of microscopes light and electron, Cytological techniques - cell fractionation, Homogenization Centrifugation, Isolation of Sub-cellular components. Biochemical technique – Electrophoresis and their applications.

UNIT – II

Cell – Cell theory, Ultra structure of animal cell – structure, composition and functions – cell components – Plasma Membrane – Endoplasmic reticulum, Ribosomes, Golgi Complex, Lysosomes, centrioles and Mitochondria.

UNIT – III

Nucleus – Ultrastructure, Composition and Function – Nuclear Membrane Nucleoplasm-Chromosomes DNA, RNA, Protein Synthesis – Nucleolus.

UNIT – IV

Cell cycle and cell division – Amitosis, Mitosis and meiosis and their significance.

UNIT – V

Semi conservative replication, mechanism and enzymology of DNA replication, structure and functions of DNA & RNA [mRNA, tRNA, rRNA].

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Cohn, N.S., 1979, Elements of Cytology, Freeman Book co., New Delhi.

De Robertis, E.D.P. and E.M.F. De Robertis, 1988. Cell and molecular Biology, 8th Edition, International edition Informes Hongkong. 734p.

Gies, A.C., 1979. Cell Physiology, Saunders co., Philadelphia, London, Toronto, 609p.

Powar, C.B., 1989. Essentials of Cytology, Himalaya Publishing House, Bombay, 368p.

Verma, P.S., and V.K. Agarwal, 1995. Cell and Molecular Biology, 8th Edition, S. Chand & Co., New Delhi, 567p.

Rastogi. S.C. Cell and Molecular Biology, 2008 2nd Edition, New Age International (p) Ltd., New Delhi.

G.P. Jayanthi 2009 Molecular Biology, M.J P Publ. Chennai.

LED BASED SUBJECT

PAPER – 1

A. PUBLIC HEALTH AND HYGIENE

Objectives:

To impart awareness on public health and Hygiene

To create knowledge on Health Education.

UNIT – I

Scope of Public Health and Hygiene – nutrition and health – classification of foods – Nutritional deficiencies – Vitamin deficiencies.

UNIT – II

Environment and Health Hazards – Environmental degradation – pollution and associated health Hazards.

UNIT – III

Communicable diseases and their control measures such as Measles, Polio, Chikungunya, Rabies, Plague, Leprosy and AIDS.

UNIT – IV

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

UNIT – V

Health Education in India – WHO programmes – government and voluntary Organizations and their health service – Precautions first Aid and awareness on sporadic diseases.

Park and Park, 1995: Text book of preventive and social medicine – Banarsidas Bhanot Publ. jodhpur- India.

Verma, S. 1998: Medical zoology, Rastogi Publ.- Meerut- India

Singh, H.s. and Rastogi, P. 2009: Parasitology, Rastogi Publ. India.

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

PAPER – 1

B. SINGLE CELL PROTEIN CULTURE

Objectives:

To emphasize the importance of integrating new knowledge of Food Biotechnology.

To update the technological innovations of Microbial organisms and its applications in Nutrition.

UNIT – I

The scope of food biotechnology- characterization, classification and identification of Microorganisms employed in single cell protein cultivation.

UNIT – II

Algal sources of single cell proteins – Culture and extraction of SCP from *Spirulina maxima*, *Chlorella* species.

UNIT – III

Bacterial sources of single cell proteins – culture and extraction of SCP from *Bacillus* species and *Methylococcus capsulatus*.

UNIT – IV

Fungal sources of single cell proteins – culture and extraction from yeasts such as *Candida* species and *Saccharomyces* species. Extraction from filamentous fungi such as *Agaricus* species, *Aspergillus* species and *Penicillium* species.

UNIT – V

General account on the production of SCP from Biomass and Waste Materials. Nutritive values of SCP – Dietary supplements for Human, Cattle and birds.

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Arumugam, N. 2006: Microbiology, Saras Publ. Nagercoil – India.

Kumarasan, V. 2001: Biotechnology, Saras Publ Nagercoil – india.

Agarwal, A.K. and Parihar,P.2006: Industrial microbiology – student edition –India.

Dubey, R.C and Maheswari, D.K. 2005: A Text Book of Microbiology – S. Chand & co., New Delhi.

Rao, A.S. 1997: Introduction to Microbiology – prentice – Hall, New Delhi, New Delhi- India.

Sullia, S.B. and shantharam, S.2005: General Microbiology, Oxford IBH – Publ.. New Delhi – India.

Krishnan, A. 2005: Students Dictionary of Microbiology – Student edition – india.

IV – MAJOR ELECTIVE

PAPER – 1

A. VERMICULTURE

Objective:

To impart training on Earthworm culture technology
To create knowledge on Self - Employment opportunity

UNIT – I

Earthworm classification – Morphological and Anatomical characteristics. Biology of Lampito maruitti.

UNIT – II

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

UNIT – III

Vermicomposting methods such as – Small scale and large scale pit method, heap method, window method 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

Application of Vermicomposting in Agriculture and Horticultural practices. Advantage of Vermicomposting.

Reference Books:

- Edwards, C.A., and Bother, B. 1996: Biology of Earthworms – Chapman Hall Publ. Co., London.
Ismail, S.A. 1997: Vermitechnology – the Biology of Earthworms – Orient Longman Publ. – India.
Ranganathan, L.S. 2006: Vermibiotechnology from soil health to Human health – Agrobios – India.
Talashikar, S.C. 2008: Earthworms in Agriculture – Agrobios - India
Gupta, P.K. 2008: Vermicomposting for sustainable agriculture [2nd edition] – Agrobios – India.

PAPER – 1

B. POULTRY FARMING

Objective:

To impart training on Modern Poultry Farming Technology

To create knowledge on self employment opportunity.

UNIT – I

External morphology of variety of fowls such as Plymouth rock, light Sussex, Minorca, Rhode Island, Red and White Leghorn.

UNIT – II

Classification of fowls based on their use: meat type such as Broilers, Egg type such as white leghorn and commercial layers, Dual purpose varieties, game and ornamental purpose varieties.

UNIT – III

Feeding poultry – Management of Egg Layers – Management of Broilers in large scale farms.

UNIT – IV

Poultry diseases viral, Bacterial, fungal, Protozoan and parasitic Lice etc. Prevention and precautions during vaccination.

UNIT – V

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

Reference Books:

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

Sastry, Thomas and Singh, 1982: Farm Animals Management and Poultry production – Vikas Publ. co. New Delhi – India.

Harbans Singh and Earl.N. Moore, 1982: Live stock and poultry production – prentice hall India Publ. Co., New Delhi – India.

Banarjee, G.C. 1986: poultry, Oxford – IBH publ. co., New Delhi – India.

SEMESTER IV

PAPER – 4

GENETICS AND BIOTECHNOLOGY

Objectives:

Genetics

To know the principles of genetics, pedigree analysis and population genetics.

To learn some genetic studies in man and applied Genetics.

Biotechnology

To integrate biology with technology. To study the application of scientific and engineering processes in the processing of materials by biological agents.

GENETICS

UNIT – I

Introduction to genetics – Basis of Mendelian Inheritance and Mendelian Laws – Interaction of Genes – Complementary Factors, Inhibitory and lethal Factors – Atavism. Multiple Alleles – Blood Groups and their Inheritance in Human.

UNIT – II

Linkage and crossing over – Drosophila – Morgan's Experiments - Cytological Evidence for Crossing Over. Sex determination and sex linkage in Drosophila and Man.

UNIT –III

Non – Disjunction and Gynandromorphs –Cytoplasmic Inheritance – Maternal effect on Limnaea [shell coiling], Fine Structure of Gene – Cistron – Recon, Muton – Gene Regulation – Operon concept – Lac Operon.

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Mutation – chromosomal Aberrations – examples from Human – applied Genetics – Animal Breeding – Heterosis, Inbreeding, Out breeding, Out Crossing, Hybrid Vigour.

BIOTECHNOLOGY

UNIT – V

Definition – Tools of Genetic Engineering – Enzymes, Linkers and Adaptors, Cloning vectors [plasmids, pBr322, Phage λ , Cosmids and phagemids].

Techniques of Genetic Engineering _ recombinant DNA Technology and gene Cloning in prokaryotes [cDNA and Genomic Library].

Application of Recombinant DNA technology in Medicine & Agriculture.

Reference Books:

Verma, P.S. and V.K. Agarwal, 1995 Genectis, 8th edition, S. Chand & Co, New Delhi – 110 055. 580pp.

Gunther S. Stent, 1986. Molecular Genetics. Macmillan Publishing Co Inc. 773pp.

Higgins II, Best GJ and Jones J [1996] Biotechnology – Principles and application Black well scientific Publication Oxford London.

Gupta P.K. Elements of Biotechnology [2001] Rastogi publication, Meerut.

Dubey 2006 Text Book of Biotechnology S. Chand & co. New Delhi.

Gardener. 1991. Principles of Genetics. 8th edition. John wiley & sons Inc. New York. Chichester, Brisbane, Toronto, Singapore.

Monroe. W. Strick Berger 2004 Genetics. Printice Hall of India New Delhi.

Kumar H. D.1998 A text book of Biotechnology, affiliated East West pvt. Ltd., New Delhi.

Nicholls. 2002 Genetic Engineering, Cambridge University Press. UK.

S. Gladis Helen Hepsyba and CR. Hemalatha 2009 Basic Bioinformatics MJP Publ. Chennai.

MORE PRACTICAL – II

CELL AND MOLECULAR BIOLOGY, GENETICS AND BIOTECHNOLOGY

CELL AND MOLECULAR BIOLOGY

Use of microscope, camera Lucida, Stage and Ocular Micrometers

Blood Smear Preparation – Differential count of W.B.C.

Total count of RBC and WBC using Haemocytometer.

Mounting of Buccal Epithelium.

Mitosis in onion root tip squash.

Squash preparation of Grass hopper testes (or) Squash preparation of Salivary glands of chironomous larva.

Study of prepared slides of histology.

Columnar Epithelium

Ciliated epithelium

Glandular Epithelium

Cartilage T.S.

Bone T.S.

Cardiac Muscle

Striated muscle

Non Striated muscle

Neuron

Male germ cell

Female germ cell

GENETICS

Observation of common Mutants of Drosophila.

Human Blood Grouping.

BIOTECHNOLOGY

Study of prepared slides, Models or specimen.

Escherichia coli

Bacteriophage

Plasmid

Demonstration of P.C.R technique: Southern blot, Electrophoresis

Visit to Biotechnology lab and Report.

ILL BASED SUBJECT

PAPER – 2

A. BIOFERTILIZER PRODUCTION

Objectives:

To impart awareness on bio fertilizer technology

To create knowledge on Environmental degradation

UNIT – I

Scope of Bio fertilizers – types of soil – physical and chemical composition of soil.

Types of microorganisms in soil

UNIT – II

Production of bacterial bio fertilizers – Mass production and utilization of different strains of cyanobacteria. Mass cultivation fo Azolla and its utilization.

UNIT – III

Isolation and identification of endophytic nitrogen fixers. Rhizobium and legume root nodulation and Nitrification process.

UNIT – IV

Production of Micorrhizal Bio fertilizer – Phosphate solublising microorganisms – VAM – vesicular Arbuscular Mycorrhizal fungi its applications as bio fertilizers.

UNIT – V

Use of composite Bio fertilizers – Methods for enhancing soil fertility. Renewable properties of bio fertilizers. The cost / benefit analysis of production and application of bio fertilizers.

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

Sharma, A.K. 2007: Bio fertilizer for sustainable agriculture – Agrobios – India

Pandiyarajan, P. 2008: Techniques in Agricultural Microbiology – Agrobis – Jodhpur – India.

Purohit, S.S. 2005: Microbiology – Fundamentals and Application [6th edition] student edition – Jodhpur – India.

Dubey, R.C., and Maheswari, D.K. 2007: A text book of microbiology – S. Chand & co., New Delhi, India.

PAPER – 2

B. APICULTURE

Objective:

Entrepreneur motivation for practicing apiculture as cottage industry.

UNIT – I

History – Biology and classification of honey bee, species of honey bees, Social organization of honey bee colony.

UNIT – II

Bee hive – Flora for apiculture – selection of Bees for apiculture, Method of bee keeping – Indigenous method of extraction of honey.

UNIT- III

Modern method of apiculture – appliances for modern method,
Diseases of honey bee and control measures.

UNIT- IV

Products of bee keeping: Honey – bee wax bee venom – Honey
Production, chemical composition – Economic importance of Honey bee wax.

UNIT – V

Bee enemies - Bee Keeping industry – Recent Efforts – Modern method in employing honey bees for cross pollination in horticultural gardens.

Reference Books:

M.S. Nalina Sundari 2006, Entomology M.J.P Publications, Chennai

Sardar singh, Bee keeping in India.

Sharma.P.L., & Singh S. Hand Book of Bee Keeping.

Honey – A Comprehensive survey – International Bee Research Association for House – CNRC [England]

Roger. A. Morse,1990. The ABC & XYZ of Bee culture, 40th ed., A.I Root & Co, Medina, Ohio
44256.516pp

IV – MAJOR ELECTIVE

PAPER – 2

A. SERICULTURE

Objective:

To impart training on silk worm culture technology

To create knowledge on self employment opportunity

UNIT – I

Classification of commercial varieties of mulberry. Mulberry plantation establishment and cultivation practices.

UNIT – II

Diseases of mulberry – fungal, bacterial, viral and nematode diseases, deficiency diseases and their remedial measures.

UNIT – III

Silkworm rearing operations – Chawki rearing and late age rearing techniques.

UNIT – IV

Physical and commercial characters of cocoons. Reeling operations, importance of by – products of Sericulture.

UNIT – V

Economics of Sericulture – Future and progress of sericulture industry in India. Prospects of sericulture as self Employment venture.

Reference Books:

Ganga, G. 2003: comprehensive sericulture Vol-I, Moriculture – Oxford –IBH Puubl. Co. India.

Ganga, G. 2003: comprehensive sericulture Vol –II Silkworm rearing – Oxford – IBH Publ. Co. India.

Ganga, G. and Sculochana Chetty, J. 1997: An Introduction to sericulture Oxford – IBH Publ. Co. India.

PAPER – 2

B. AQUARIUM FISH KEEPING

Objective:

To impart training on Aquarium fish keeping technology

To create knowledge on self employment opportunity

UNIT – I

The potential scope of Aquarium Fish industry as a Cottage Industry. Exotic and Endemic species of Aquarium Fishes.

UNIT – II

Common characters and sexual dimorphism of Fresh water and Marine Aquarium fishes such as Guppy, Molly, Sword tail, Gold fish, Angel Fish, Blue Morph, Anemone fish and Butterfly fish.

UNIT – III

Food and feeding of Aquarium fishes – use of live fish feed organisms. Preparation and composition of formulated fish feeds.

UNIT – IV

Live fish transport – Fish handling, packing and forwarding techniques.

UNIT – V

General Aquarium maintenance – budget for setting up an aquarium fish farm as a cottage industry.

Reference Books:

Jingran V.G., 1991: Fish and fisheries in India – Hindustan Publ. co New Delhi – India.

Shanmugam K. 1992, Fishery Biology and Aqua Culture – Leo Pathipagam – Chennai- India.

Mill Dick, 1993: Aquarium fish, DK Publ.Co,Inc. New York –USA

Yadav. 1995: Fish and fisheries, Daya publ. co., New Delhi – India

Hall, C.B. 2005: Ponds and Fish culture – Agrobios – Jodhpur – India.

Day,F. 1978: Fishes of India Vol. I & II, William Danisan & Sons, India.

SEMESTER V

PAPER – 5

BIOSTATISTICS AND BIOINFORMATICS

Objective:

To get a basic knowledge o statistical methods and computations in biology.

To study the application of information sciences [mathematics, statistics and computer sciences] in biology.

To study the application of information technology to the management and analysis of biological data.

UNIT – I

Biostatistics – Definition and Scope, Census and sampling methods – collection and presentation of data. Diagrams and graphs; bar, pie Histogram, Line graph – concept of Statistical population and sample characteristics of frequency distribution sampling.

UNIT – II

Measures of central tendency: mean, median and mode. Measure of Dispersion, Range, Quartile deviation, mean deviation & Standard deviation.

BIOINFORMATICS

UNIT – III

MS-WORD: File operations New, Save & Print – Editing: Cut, Copy, Paste, Find and Replace – Insert: Page Numbers and Pictures – Format: Font, Bullet & Numbering, Paragraph and Background Tools: Spelling and Grammar – Data: Sort – MS.EXCEL: Presentation of Bio Statistical data using Excel: Auto sum, Paste Function, Chart Wizard, Sort Function and Drawing – Use of Internet, Messenger and E-mail – Basic Knowledge of Medical transcription and Bio – Informatics.

UNIT- IV

Bioinformatics – definition – Literature databases- NCBI – Pubmed, Medline, Protein and Nucleic Sequence databases – PIR, Swiss – Prot, GeneBank, DDBJ – Structure Databases – PDB, SCOP, CATH, Structure visualization tools, RasMol, Swiss PDB viewer.

Pairwise sequence Alignment –Scoring Matrice - PAM and BLOSUM- statistics of alignment scored Dot Plot – local and global alignment – Database searching – FASTA and Blast multiple sequence alignment clustal W- Phylogenetic Tress – PHYLIP.

Reference Books:

Statistics – SP Gupta 1996 S. Chand and Co., New Delhi.

Jerold H. Zar Bio Statistical analysis [2nd edition] printice Hall of International edition, 1984
[Relevant portions]

Goutham Roy. Introduction to Computing and computing lab and Cad [2002] Books and allied [pvt] Ltd. Kolkata.

MS. OFFICE for Win – Microsoft office press.

Developing Application with MS-OFFICE _ Christine. Solomon – Microsoft Office Press.

Developing Bioinformatics Computer Skills Cynthia Gibbs, Sheoff Publishers & Distributors Pvt. Ltd., Mumbai.

Arthur. M. Lesk, Introduction to Bioinformatics, Oxford University Press, New Delhi, 2003

Arthur. M. Lesk, Introduction to protein Structures Oxford University Press, New Delhi, 2000

Baxevanis, A and Outllette. Bioinformatics a practical guide to the analysis of genes and proteins, Willy – Interscience, Hoboken, NJ. USA 2005.

PAPER – 6

DEVELOPMENTAL BIOLOGY & IMMUNOLOGY

Objectives :

To study ontogenesis, the development of animals including parthenogenesis.

To study embryonic adaptations, human reproduction and reproductive technology in man.

To study the process which help to maintain the organisms internal environment, when challenged with foreign substances.

To understand the advances in Immunology

UNIT – I

Spermatogenesis and Oogenesis – comparative study of invertebrate, vertebrate sperms and eggs, polarity & symmetry of eggs – Fertilization Mechanism, Physiology & theories – parthenogenesis – Natural – artificial – Experiments on Artificial Parthenogenesis.

UNIT – II

Cleavage – Factors influencing cleavage – fate map – blastulation and gastrulation; general principles – physiology and comparative study in amphioxius, frog and chick – Experimental works of speeman and Mangold-Development of brain and eye in frog.

UNIT – III

Embryonic adaptations; Embryonic membranes and their functions in chick – placentation in mammals. Puberty – Menstrual cycle-contraception – family welfare reproductive technology; Artificial insemination-cryopreservation-IVF-Embryotransfer – Test tube babies – Bioethics.

UNIT- IV

Types of immunity – their role in parasitic, bacterial & Viral Infection, in hyper – sensitivity and graft rejection – Lymphoid organs, cells of immune system – their role in immune response – Antigen – Antibody reaction.

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Immunoglobulin – types, structure, Physico chemical and biological properties – Immunoprophylaxis – Immunization schedule of children. Immuno deficiency – ADIS, Immunotechniques.

Reference Books:

- Balinsky, B.L., 1981. Introduction to embryology Saundeers, Philadelphia.
- Berril & Corp Developmental Biology. McGraw Hill Book Company, MC.,New York.
- M.S.Jayaraj An Introduction to embryology Veer Bala Rastogi Publication.
- Verma, P.S., V.K. Agarwal and Tyagi, 1995. Chordate embryology. S. Chand & co., New Delhi.
- Majumdar, N.N. 1990. Text Book of Vertebrate embryology. Tata McGraw – hill Publishing company Ltd. New Delhi.
- McEwen, R.S., 1969. Vertebrate Embryology. Oxford and IBH Publishing Co., New Delhi.
- Jain, P.C 1998, Elements of Developmental Biology. Vishal Publication, New Delhi.
- Dubey 2006 Text book of Biotechnology S. Chand and Co., New Delhi.
- Roitt.I.M 2000 Essential Immunology, Blackwell Scientific Publishers.
- Paul, W.E.M. 1989, Fundamental Immunology, Raven Press, New York.
- Kuby. J.1999, Immunology. W. H. Free man and Co. New York.
- Current protocols in Immunology – 3 Volumes 1994 Wiley Publications.
- Roitt. I, Brostoff, J. and Male. D. 2002. Immunology, Mosby, New York.
- Richard, A. Golds, Thomas I, Kindt & Barbara A. Osborne 2000 Kuby Immunology, Freeman and Co. New York.
- Madhavee Latha. P, 2012. Text book of Immunology, S. Chand & Company.

PAPER – 7

ANIMAL PHYSIOLOGY

Objective:

To study the basic principles of animal Physiology, Chemical and physical properties of living matter.

To understand the physiology of various organs and organ systems.

UNIT – I

Nutrition – Food requirements – Carbohydrates, proteins, fats, minerals, and vitamins. Digestive enzymes and their role in digestion – Metabolism – Metabolic Pathways with reference to carbohydrates.

UNIT – II

Respiration – Respiratory Pigments and functions. Transport of gases [CO_2 and O_2] – Respiratory quotient. Circulation Types, Composition, Properties and Function of Blood – Human - Cardiac Cycle – Cardiac Rhythm – Origin of heart Beat – Regulation of heart Beat – ECG – Blood Pressure – Factors Contributing to heart Problems – coronary circulation.

UNIT – III

Excretion – kinds of excretory products – Kidney - structure and Mechanism of urine formation in mammals, hormonal regulation of excretion. Kidney failure and Transplantation. Osmoiono regulation in fishes and mammals. Muscles – Types of muscles – Muscle Proteins – Mechanism of contraction – Cori cycle – Theories of muscles contraction.

UNIT – IV

Nervous tissue – Neuron – Structure, types of neurons. Nerve impulse – Synapse – Synaptic transmission of impulses – Neurotransmitters. Receptors – Photoreceptor – mammalian eye – structure of retina – visual igments – physiology of vision – phonoreceptors – mammalian ear- Organ of Corti – working mechanism – phonoreception in bat.

Endocrine glands – structure, secretions and functions of endocrine glands of vertebrates – Pituitary, Hypothalamus, Thyroid, Parathyroid, Adrenal, Thymus, Islets of Langerhans, Sex organs.

Reference Books:

Sambasivaiah, Kamalakara Rao and Augustine Chellappa 1990. A Text book of Animal physiology and ecology, S. Chand & Co., Ltd., New Delhi – 110 055.

Parameswaran, Anantakrishnan and Ananta Subramanyam, 1975. Outlines of Animal Physiology, S. Viswanathan [Printers & Publishers] Pvt. Ltd.

William S. Hoar, 1976. General and comparative physiology, Prentice Hall of India Pvt. Ltd., New Delhi. 110 001.

Wood, D.W., 1983, Principles of Animal Physiology 3rd Ed.,

Prosser, C.L. Brown, 1985, Comparative Animal Physiology, Satish Book Enterprise, Agra – 282 003.

ELECTIVE

PAPER – 1

A. BIO-INSTRUMENTATION

Objective:

To acquire the knowledge of basic principles and applications of tools. To know the techniques for the measurement of physical, physiological, biochemical and biological factors in man and other living organism.

UNIT – I

Units of measurements – metric system conversion of units, Microscopy – principles & types [simple, light, phase contrast, polarizing dark field & electron] Autoclave- principle & application and types.

UNIT – II

Centrifuge – principles & types [clinical, centrifuges] pH – Sorenson's pH Scale, pH meter- Principle and applications. Manometry, Warburg Manometer – Principle & working.

UNIT – III

Chromatography – principle types [paper, Thinlayer, column] and applications, electrophoresis – principles, types – paper & gel [AGE & PAGE] and applications.

UNIT – IV

Spectroscopy – principles & use of colorimetry and NMR [Nuclear Magnetic resonance] spectroscopy; Radio isotopic technique – Radio Immuno assay Biochemical application of radio isotopes.

UNIT – V

Biosensors principle, - types [Enzyme, Bacterial electrodes, environmental bio sensors & Bioreporters & application] DNA & RNA sequencing methods, PCR – Principle & application. DNA Micro array and its application.

Veerakumari,L, 2006. Protein sequencing in bio informatics bioinstrumentation, MJP publ. Chennai.

W.W.Unbriet, Z.H. Burri and Stamffier J.F. Manometric and Biochemical techniques, 5th Ed. Burges Pub.Co. Minneapolis 1972.

Biophysics : An introduction, R.M.J Cottenill John Wiley & Sons Ltd, England.

M.A.Subramanian 2005, Biophysics (Principles and Techniques) MJP publishers, Chennai.

A.Upadhyaya, K.Upathyaya and N.Nath, (2003) Biophysical chemistry, Principles and Techniques, 3rd Ed, Himamalaya publishing house.

H.B.Bull, F.H.Davis, An introduction to physical Biochemistry 2nd Ed, Philadelphia 1971.

Gurumani.N 2006. Research methodology for biological sciences MJP publ. Chennai.

PAPER – 1

B. HUMAN ENDOCRINOLOGY

Objective:

To learn about the hormonal regulation and their defects in man.

UNIT – I

Classification and characteristic features of hormones

Structure of hypothalamus and pituitary Gland – Hormones of pituitary gland Adenohypophysis or Anterior lobe of pituitary gland.

Pars intermedia or Middle lobe of pituitary Gland

Neurohypophysis or posterior lobe of pituitary Gland.

Hypothalamic regulation for release of pituitary hormones.

UNIT – II

Structure of thyroid Gland – Biosynthesis of thyroid hormones

Biological functions of Thyroxine, Regulation of Thyroid secretion

Thyroid Dysfunction – parathyroid Glands

Biological Action of parathyroid Hormones – Parathyroid Dysfunction

UNIT – III

Structural features- hormones of Adrenal Cortex

Biological Action of Adrenaline and Noradrenaline – Emergency Hormones.

UNIT – IV

Islets of Langerhans – Insulin – Biosynthesis of Insulin-

Regulation of the secretion of Insulin - Biological Action of Insulin

Mechanism of Action of Insulin.

UNIT – V

Male reproductive system – Hormonal control of testes

Chemistry and Biosynthesis of Testosterone – functions of testosterone

Female reproduction system – role of Hormones in Female sexual Cycle

Placental hormones – parturition – Lactation.

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Mac E Hadley, 1992 Endocrinology, Third edition, prentice Hall, New Delhi Jersey

Matsumoto A. and Ishi S., 1992 [eds]. Atlas of endocrine organs, vertebrates and invertebrates
springer verlag, germany.

Wilson J.D and Foster D.W 1992, William's textbook of endocrinology, 8th edition, WB saunders
company, Philadelphia.

World health organization Technical report series, 1992, Oral contraceptives and Neoplasia WHO,
Geneva.

Turnerm C.D and Bagnarr, J.T., 1994, General Endocrinology, 6th edition, WB saunder's company,
Philadelphia [saunder's international students edition]

Lamming, G.E. 1984. Marshall's Physiology of Reproduction; Reproductive cycles of vertebrates.
Churchill livingstone, Edinburgh.

Prakash S Lohar Endocrinology, Hormones and Human Health.

ILL BASED SUBJECT

PAPER – 3

A. PISCICULTURE

Objective:

To introduce basic knowledge of fish culturing methods and techniques.

UNIT – I

Scope of Aquaculture. Importance of cultivable fresh water, Marine and ornamental species, maintenance of aquarium , Exotic fishes.

UNIT –II

Fish farm Maintenance – Farm management technique, water quality, temperatures and accessories in farm management viz Aerator, filter, paddler.

UNIT – III

Fish culture technique: Monoculture, Polyculture and Monosex culture, Induced fish breeding, integrated fish farming.

UNIT –IV

Fish nutrition and fish feed formulation, live fish handling and transport.

UNIT – V

Prevention and control of fish diseases.

Reference Books:

Jhingran V.G. 1985, Fish & Fisheries of India, Hindustan Publishing Co. New Delhi. 666p

Trivedi K.K [Ed] 1986 Fisheries Devt. 2000 AD. Association of India fisheries industries, Oxford & IBH, New Delhi 268pp.

PAPER – 3

B. VEGETABLE MEAT CULTURE

Objectives:

To emphasize the importance of integrating new knowledge on food biotechnology.

To update the technological innovations of edible mushrooms and their application in Nutrition.

UNIT – I

General characters and classification of Edible Mushrooms. Food Biotechnological innovation on diets.

UNIT – II

Identification of useful and harmful mushroom. Preparations for mushroom culture – Bed preparation – Nutrients preparation climatic conditions and parameters, spawn preparation for laboratory and industrial Mushroom culture.

UNIT – III

Culture of common Edible Mushrooms such as *Agaricus comestris*, *Agaricus arvensis*, *Morechella, esculanta*, *Volvaria terastius*.

UNIT – IV

Culture and common cattle Mushroom such as *Amantia rubescenes* *Armillaria melea*, *trhcholoma equesture*.

UNIT – V

Nutritive values of Edible Mushrooms – Chemical compositions – Carbohydrate proteins, Lipids, Vitamins and organic acids, contents of edible Mushrooms – Nutrient supplements for Human consumption as vegetable meat.

- Kumarasan, V.2001: Biotechnology Saras Publ. Nagercoil – India
- Ranga, M.M 2005; Animal Biotechnology, Students Edition, New Delhi, India.
- Reddy, D.V. 2006: Principles of Animal Nutrition and Feed.
Technology – Oxford IBH Publ. New Delhi, India.
- Dubey, R.C. 2006: A Text Book of Biotechnology, S. Chand & co, India.
- Purohit, S.S. 2005: Biotechnology, Student edition, New Delhi – India.
- Singh, Ritti: 2005: Modern Mushroom Cultivation – Agrobios.
- Suman, B.C. 2007: Mushroom cultivation, Processing and uses agrobios - India
- Dey, S.C.2008: Mushroom Growing – Agrobios – India.
- Pathak, V.N. 2007: Mushroom Production and Processing Technology – Agrobios – india.
- Sharma, V.P. 2006: Diseases and pests of mushrooms Agrobios – India.

SEMESTER VI

PAPER – 8

ENVIRONMENTAL BIOLOGY

Objective:

To realize the importance of inter relationship between every organism and environment.

To study the impact of eco factors on the morphology & distribution of organisms.

UNIT – I

Scope – concept – Branches in ecology – Autecology, synecology Micro and macro environment – types of media and substratum and their influences on animals – Water: Properties, Forms of water, Soft and hard water. Air composition – properties. Substratum: Soil -Types, soil formation, soil group of India, soil profile.

UNIT – II

Biosphere – Hydrosphere – Lithosphere – Atmosphere – temperature: Distribution of temperature, thermal stratification – Temperature as a limiting factor, thermal adaptations. Light as a limiting factor. Pressure gravity, Moisture and humidity. Liebig's law minimum, Shelford's law of tolerance.

UNIT – III

Biogeo chemical cycles – gaseous cycle [N₂] sedimentary cycle, [phosphates] Intra specific and inter specific animal association : colony formation, social organization, predation, parasitism, commensalisms, mutualism, inter specific competition – competitive principle or Gause's principle.

UNIT – IV

Population : Definition – characteristics – Natality, Mortality, age distribution Population growth forms, population fluctuation. Community Ecotone and edge effects – ecological succession. Conservation - Wild life management, Preservation – laws enforced – sanctuaries, National parks. Natural resources management : renewable and non-renewable.

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Environmental degradation – deforestation, urbanization, population explosion and other environmental hazards – depleting natural resources and relationship between poverty and environmental degradation and vice versa. Environmental ethics and laws – Earth summits – role governmental agencies for environmental monitoring.

Reference Books:

Kotpal. R.L, and N.P. Bali, 1986. Concepts of Ecology, Vishal Publications, New Delhi – 7

Rastogi V.B, and M.S. Jayaraji, 1988 – 1989. Animal Ecology and Distribution of animals, Kedar nath, Ram Nath Meerut – 250 001.

Clark, G.L. 1954, Elements of Eology, John wiley & Sons Inc., New York, London.

Ananthkrishnan, T.N, and S. Viswanathan, Principles of Animal Ecology.

Eugene P. Odum, 1971. Fundamentals of ecology, Saunders International Student Edition, W.B. Saunders Company, Philadelphia London, Toronto.

Verma, P.S and Agarwal 1986, Environmental Biology, S. Chand & Co Ltd.

Richard, Manual of wild life conservation.

THEORETICAL PRACTICAL – III

ANIMAL PHYSIOLOGY, DEVELOPMENTAL BIOLOGY AND IMMUNOLOGY

ANIMAL PHYSIOLOGY:

Study of human salivary amylase in relation to either pH or Temperature.

Estimation of Oxygen consumption in a fish with reference to body weight.

Detection of nitrogenous waste products in fish tank water, frog tank water, bird excreta and mammalian urine/ Kidney.

Use of Kymograph Unit, B.P. apparatus, stethoscope.

DEVELOPMENT BIOLOGY:

Study of the following prepared slides / museum specimens

Section of testis and Ovary [Mammalian]

Slides of Mammalian sperm and ovum.

Study of Egg types – Frog's Egg, Hen's Egg.

Study of cleavage stages 2 Cell, 4Cell, 8Cell – Blastula and gastrula of Frog.

Slides of different stages of chick embryo – 18 hours [primitive streak stage], 24 hours, 48 hours 72 hours and 96 hours.

Placenta of Sheep, Pig and Man

IMMUNOLOGY:

Study of Antigen – Antibody reaction – Human Blood grouping [ABO and Rh]

Study of prepared slides of histology:

Thymus

Spleen

Bone marrow

Lymph node.

PAPER – 9

ECONOMIC ZOOLOGY

Objecives :

- To encourage young learners to take up the small scale industries
- To generate motivation for self-employment
- To disseminate information on economic aspects of zoology.
- To inculcate knowledge on useful animals to Mankind
- To satisfy the learners with modern techniques of animal culture.

UNIT – I

Vermiculture : Methods of composting

Economic entomology

Apiculture - Species of Honeybees –Honey extraction – Economics of Apiculture and management.

Sericulture – Nature and economic importance of sericulture in India.

UNIT –II

Economics of aquaculture

Prawn culture – Culture techniques of fresh water [*Macrobrachium rosenbergii*] & Marine water (*Penaeus monodon*)

Pearl culture : Formation and nature of Pearls – Commercial importance of Pearl Culture in India.

Pisciculture – Techniques of induced breeding, commercial culture of catla & catfish, By-products of fishing and its commercial values.

UNIT – III

Economics of Poultry keeping. Morphology of different breeds of Chicken – Brooding and Rearing of Chicks – Processing of Egg, Meat and By-Products of Poultry.

UNIT – IV

A]: Dairy farm management, Milch breeds. Draught Breeds, Dual Purpose breeds and New cross Breeds of Cows and Buffaloes in India.

B]:Sheep farming: Indigenous and Exotic breeds of sheep

UNIT – V

Future strategies for Livestock Development – Transgenic animal Technology – Genetic Improvement for best Breeds – Economic importance of Dairy, Leather, Wool, Fur and Pharmaceutical Industries in India.

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Sukla, G.S. and Upadhyay, V.B., 2000

Economic Zoology – ISBN – 81- 7133 -137 -8

Rastogi Publication, Meerut, India

Jawaid Ahsan and Subhas Prasad sinha – 2000

A Handbook on Economic Zoolgy - ISBN – 81 – 219- 0876 – 0

S. Chand & co., Ltd., New Delhi.

Ashok Kumar and Prem Mohan Nigam, 1991

Economic and Applied Entomology

Emkay Publication, New Delhi.

Shammi,Q.J. and Bhatnagar, S., 2002

Applied Fisheries: ISBN – 81 – 7754 – 114 – 5

Agrobios [India], jodhpur - India

Major Hall, C.B. 2005

Ponds and Fish culture – ISBN – 81 – 7754- 146 – 3

Agrobios [India], jodhpur - India

Keith Wilson, N.D.P., 2005

A Handbook of Poultry Practice – ISBN – 81 – 7754 -0- 69- 6

Agrobios [India], jodhpur - India

Banerjee, G. C. 1992

Poultry – III – Edition – ISBN – 81 – 204 – 008 – 4

Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

Banerjee, 1988

A text book of Animal Husbandry – VIII- Edition – ISBN – 81- 204 – 1260 -5

Oxford & IBH Publishing co. Pvt. Ltd., New Delhi.

Kaushish, S.K., 2001

Trends in livestock Research – ISBN – 81 – 7754 – 112 - 9

Agrobios [India], jodhpur - India

Ismail, S.A1997. Vermicology the Biology of Earth worm orient Longman, India.

A. Mary Violet chrishty 2008 Vermi techonology MJP Publ. Chennai.

THEORETICAL PRACTICAL – IV

ENVIRONMENTAL BIOLOGY AND ECONOMIC ZOOLOGY

ENVIRONMENTAL BIOLOGY:

Estimation of Dissolved oxygen, salinity, pH, Free CO₂, Carbonate and Bicarbonates in water samples.

Use of rain gauge, Maximum and Minimum thermometer, Hygrometer and Anemometer.

Plankton study – fresh water and Marine plankton.

Study of natural ecosystem and field report.

ECONOMIC ZOOLOGY:

Study of the following prepared slides / specimens

Earthworm types [any two] – [vermiculture]

Megacolex mauritii – south Indian species – surface crawlers

Drawida modesta – Redsoil with calciferous gland

Pheretima posthuma – North Indian – Large specimen

Eudrilus eugenia – Redworm, Exotic.

Fish parasites [Lernea, Argulus]

Larvivorous fishes :

Poecelia reticulate – Guppy

Gambusia Affinis – Gambusi

Colisa labia – Dwarf gowrami

Different stage of silk worm

Types of bees

Common pests.

PAPER – 10

EVOLUTION

Objectives :

To comprehend the scientific concepts of animal evolution through theories and evidences.

UNIT – I

Evidences : The need of evidences for the fact of evolution – Morphological, Embryological, Physiological and Biochemical evidences.

UNIT – II

Theories : Lamarckism, Neolamarckism, Darwinism, NeoDarwinism, Devries concept of Mutation, Modern version of Mutation theory.

UNIT – III

Natural selection :Types, stabilizing and diversifying directional selection, variation : Types of variation.

UNIT-IV

Mimicry – Batesian and mullerian mimicry and evolution, living fossils. Distribution of animals.

UNIT – V

Isolation – Premating and post mating isolating mechanism, speciation, Evolution of man – Biological and cultural.

Reference Books:

Agarwal, V.K and Usha Gupta – Evolution and animal distribution, Chand and Co.,

Dodson,E.O. 1990. Evolution, Reinhold, Newyork.

Francisco.J.Ayla – Evolution, Surject publication.

Gopalakrishnan.T.S. Itta Sambasivaiah and A.P.Kamalakara Rao. Principles of organic Evolution, Himalaya publishing house.

T.K.Ranganathan, Evolution. 1994 Rainbow Printers, Palayankottai.

Veer Bala Rastogi. Organic Evolution, Meerut Publications.

Arumugam.N. Organic Evolution, 2009 Saras. Publ. Nagarcoil, Kanyakumar Dt.

ELECTIVE

PAPER – 2

A. BIOCHEMISTRY

Objective:

To define and explain the basic principles of biochemistry

UNIT – I

Aqueous solutions – properties of water - hydrogen ion concentration, acids bases and their concept – buffers and electrolytes and functions – acidity, alkalinity and pH determination.

UNIT – II

Bioenergetics – energy and its forms – free energy – laws of thermodynamics – enthalpy and entropy – redox coupling and ATP bioenergetics.

UNIT – III

Biochemistry of carbohydrates, lipids, protein [structural, catalytic] – primary, secondary, tertiary and quaternary structure and characteristics of proteins, vitamins types- source & deficiency.

UNIT – IV

Enzymes: classification and nomenclature of enzymes – Physico- chemical – properties of enzymes – enzyme kinetics – mechanism of enzyme action – factors affecting enzyme activity.

UNIT – V

A brief account on the biochemistry of antibiotics & their mode of action. Fractionation of Biological materials by chromatography [PC, TLC] electrophoresis [Principle & types] centrifugation [principle & Types]

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L. Stryer, 1999 Biochemistry IV Edition. Freeman Company, New York

Lehninger, 1992 Biochemistry worth publication Inc., CBS Publication New Delhi.

H.S. Srivastava Elements of Bio Chemistry, Rastogi Publications.

Outline of Biochemistry, Corn & Stump.

Veerakumari.L, 2004, Bio Chemistry, MJP Publications.

G.P. Talwar & L.M. Srivastava, 2003 Text Book of Bio Chemistry and Human Biology Eastern Economy Edition, Prentice Hall of India. New Delhi.

PAPER – 2

B. APPLIED ENTOMOLOGY

Objective:

To study the insect species causing damage to the crops in the field as well as under storage condition and the effective control measure against them.

UNIT – I

Types of pests – types of damage caused by pests in crops – causes for insects assuming pest status – outbreak of pests.

UNIT – II

Pests of agricultural importance, their bionomics, life cycle and control measures of paddy, ground nut, cotton, tomato coffee & Banana.

UNIT – III

Pests of stored products and their control – Household pests – cockroach and termites – and their control – pest in relation to public health – rodents and their control.

UNIT- IV

Pest control methods and application: cultural, mechanical, biological and chemical methods – classification of pesticides – LC 50 and LD 50 values – First Aid & precautions in handling pesticides – pesticide spraying appliances.

UNIT – V

Pesticide industry - production and marketing – recent trends in pest control – pheromones, attractants, repellants and chemosterilants Integrated pest management, its importance & applications.

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Vasantharaj David and T. Kumaraswami 1988. Elements of Economic Entomology Popular Book Depot, Chennai.

Nayar, K.K., Ananthakrishnan, T.N. and B.V. David 1992 General and Applied Entomology Tata McGraw, New Delhi.

P.G. Fenemore, Alka Prakash 1997 Allied Entomology, Wiley Eastern Ltd., New York.

Wigglesworth J.B., 1994. Insect Physiology, Chapman and Hall, London.

Temphare D.B., 1984 A. Text Book of Insects Morphology, Physiology and Endocrinology. S. Chand and Co., New Delhi.

**ELECTIVE
PAPER – 3**

A. NANOTECHNOLOGY IN LIFE SCIENCE

Objectives:

To impart current knowledge in Nanotechnology
To create fundamental understanding of usage of Nanomaterial in life science.

UNIT – I

Scope – Fundamental Understanding of concepts and Methods of Nanotechnology – overview on Nanotechnology and Interdisciplinary field.

UNIT – II

Basic and structural Nanotechnology. Molecular and Macromolecular Levels – Nanoscales – devices and systems developed in Nanotechnology.

UNIT – III

Nanotechnology adopted in DNA computing, Molecular Nanotechnology, Quantum Nanotechnology, Optical and Particles used in Nanotechnology.

UNIT – IV

Use of carbon nanotubes, Better and cheaper nanomaterials – Evaluation of nanomaterials and nanosystems by using conventional materials.

UNIT – V

Application of nanotechnology in the fields of Agriculture, Medicine. Future perspectives of Nanotechnology in life Sciences.



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Shanmugam, S.2009 : Nanotechnology, MJP-Publ. Chennai – India.

Kumar,U, W008 : Nanotechnology – A Fundamental Approach – Agrobios – India

Ratner, 2008 : Nanotechnology-A Gentle Introduction to next big idea Tamilnadu Book House,
Chennai – India.

Goodshell, D.S, 2004 – Biotechnology : Lessons from Nature – John Wiley & Sons (Asla) Publ.Ltd,
Singappore.

PAPER – 3

B. MICROBIOLOGY

Objectives:

To emphasize the importance of integrating new knowledge on Microorganisms.

To update the Technology innovations of Microbial genetics and its Application.

UNIT – I

The scope of microbiology – characterization, classification and identification of Microorganisms.

UNIT – II

The world of Bacteria – General morphology, and physiology – pathogenic and non – pathogenic bacteria, economic importance.

UNIT – III

The world of other Micro organisms – general morphology of Fungi – Moulds and yeasts, Algae, Protozoa and Viruses.

UNIT – IV

Epidemiology of infectious diseases with reference of Human – such as Bacterial [Tuberculosis], Viral [Hepatitis], protozoan [Amoebiasis] and Fungal [any one] diseases - Host. Microbe interaction – immune responses – Antibiotics and other Chemotherapeutic agents.

UNIT – V

Applied Microbiology in the fields of food, Agriculture, Industry and environment.

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- Mani, A., Selvaraj, A.M, Narayanan, L.M & Arumugam, N. 1996 : Microbiology – saras publicagtions – Nagercoil – India.
- Sharma,P.D 1998 : Microbiology – Rastogi Publ. Meerut, India.
- Subba Rao, N.S, 1999 : Soil Microbiology, Oxford IBH Co. New Delhi, India.
- Sullia, S.B. & Santharam, S. 2004 – GeneralMicrobiology, Oxford IBH, India.
- Meenakumari,S. Microbial Physiology, MJB-Publ. – Chennai, India.
- Purushotam Kaushik, 2005 : Microbiology – S.Chand & Co., New Delhi, India.
- Vijaya Ramesh, 2005 : Environmental Microbiology, MJP.publ, Chennai, India.
- Vijaya Ramesh, 2007 : Food Microbiology, MJP.Publ. Chennai, India.
- Rajan,S 2007 : Medical Microbiology – MJP.Publ. Chennai, India.
- Mosharaffudin, Ahmed & Basumatary 2006 : Applied Microbiology – MJP Publ. India.
- Purohit, S.S.2007 : Microbiogy – Agrobios Publ. India.
- Trivedi, P.C.2008 : Applied Microbiology – Agrobios Publ. India.
- Prescott, 2009 : Industrial Micobiology – Agrobios Publ. India.
- Parihar, L. 2008 : Advances in Applied Microbiology – Agrobios Publ. India.
- Agarwal, A.K 2008 : Industrial Microbiology, AgrobiosPubl.India.
- Bohra, A.2006 : Fod Microbiology, Agrobios Publ. India.

ILL BASED SUBJECT

PAPER – 4

A. MEDICAL LAB TECHNIQUES

Objectives :

To impart awareness on Clinical Lab Technology
To create knowledge on Self-Employment Opportunity

UNIT – I

Scope of Medical Lab Technology – General procedures – Cleaning, Sterilization and Disposal of infected materials. First Aid in Laboratories.

UNIT – II

HAEMATOLOGY : Blood collection and Preservation – Blood cell countings of RBC and WBC. Hemoglobin estimation, blood sugar estimation. Basic principles of blood transfusions.

UNIT – III

Bacteria, Virus, Protozoa and Helminth pathogens – Clinical diagnosis of diseases such as Typhoid, Cholera, Tuberculosis, Polio, Measles, Amoebiasis and Filariasis.

UNIT – IV

Estimation of Urea, Glucose, Bile salts and Bile pigments in Urine, Microscopic Examination and analysis of ova, cyst and occult blood in stool.

UNIT – V

Examination of sputum, seminal fluid and Cerebrospinal fluid. Pregnancy test – Awareness and Responsibilities of Code of Ethics for Lab Technicians.

Samuel, K.M. 1992 : Notes on Clinical Lab Techniques. M.K.G. Iyer & Sons Publ. Co., Chennai – India.

Dubey, R.C., and Maheswari, D.K.2007; A text book of Microbiology S. Chand and Co. Publ. New Delhi – India.

Purohit, S.S. 2005 : Microbiology – Fundamentals and Applications [6th Edition] Student Edition – Jodhpur – India.

Mukherjee, 2006 : Medical Laboratory Technology Vol. I, II & III – Tata McGraw Hill Publ.Co., Noida – India.

Ochei, 2000 : Medical Laboratory Science – Theory and Practice – Tata McGraw Hill Publ, Co., - Noida – India.

PAPER – 4

B. INDUSTRIAL FISHERY MANAGEMENT

Objectives :

To introduce basic knowledge of industrial fishery management and export practices.
To realize the need for augmenting food production from aquatic resources.

UNIT – I

Scope of Fisheries, Commercially important Marine, Freshwater and Estuarine fishes.

UNIT – II

Fish harvesting, sorting, grading the catch, stocking in reservoirs, Fish preservation techniques - Chilling, Freezing, curing, drying, salting, smoking and canning Fish marketing, fish export potential of India.

UNIT – III

Fish spoilage – causes, autolysis, rigor mortis, chemical spoilage, microbial spoilage and remedies
Fish handling, hygiene and fish transport.

UNIT – IV

Quality management, pre requisites and inspection units. Role of MPEDA [Marine products Export Development Authority] and IIP (Indian Institute of Packaging).

UNIT – V

General unit management and role of FFDA [Fish Farmer's Development Agencies].

Reference Books:

S.K.Gupta & P.C.Gupta – 2008 General and Applied Ichthyology (Fish & Fisheries) S.Chand & Co., Ltd., New Delhi.

N.Arumugam 2009 Aquaculture Saras Publications Nagercoil, Kanyakumari Dt.

**ALLIED
PAPER – 1
CHEMISTRY – I**

UNIT - I

1.1 Extraction of Metals Minerals and Ore difference - Minerals of Iron, Aluminum and Copper - Ore Dressing or concentration of Ore - Types of Ore Dressing Froth Floatation and Magnetic separation.

1.2 Refining of Metals - Types of Refining - Electrolytic, Van Arkel and Zone Refining.

1.3 Extraction of Uranium and Thorium.

UNIT - II

2.1 Cyclo-alkanes preparation properties of Cyclo-hexane -- Bayers strain theory.

2.2 Polarization - Inductive effect, mesomeric effect and steric effect - (Acid and Base strength.)

2.3 Stereo isomerism - Types, Causes of optical activity of (lactic acid) and tartaric acid - Racemisation - Resolution - Geometrical isomerism - maleic and fumaric acid.

UNIT - III

3.1 Chemical Kinetics - Distinction between Order and Molecularity - derivation of First order rate equation - half life period of first order reaction - determination of rate constant of hydrolysis of ester

Catalysis - catalyst - auto catalyst - enzyme catalyst - promoters - catalytic poisoning - Active center - Distinction between homogeneous and heterogeneous catalysts - Industrial application of catalysts.

3.3 Photochemistry - Grothus Drapers law, stark einsteines law - quantum yield - photosynthesis, phosphorescence - fluorescence - chemiluminescence's - photosensitization.

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4.1 VSEPR Theory - Shapes of Simple Molecules BF_3 , PCl_5 , SF_6 and XeF_6

4.2 Fuels - Calorific value of fuels - Non-conventional fuels - need of Solar energy - Applications - Bio-fuels.

4.3 Osmosis - Osmotic pressure - reverse osmosis - desalination of sea water.

UNIT - V

5.1 Nuclear Chemistry - Definition of Half life period - Group displacement law - Radioactive series. Nuclear Fission and Fusion - Application of nuclear chemistry in Medicine, agriculture, industries - C^{14} dating.

5.2 Crude Oil - Petroleum - Petroleum Refining - Cracking - Applications of Cracking. Naphthalene - Preparations, Properties and uses of Naphthalene - Structure of Naphthalene.

5.3 Elements of symmetry - unit cell - crystal lattice - types of cubic lattice - one example for each.

ALLIED

PAPER – 2

CHEMISTRY – II

UNIT - I

1.1 Co-ordination Chemistry:

Nomenclature of co-ordination compounds - Werner Theory of Co-ordination Compound - Chelation - Functions and structure of Haemoglobin and Chlorophyll.

1.2 Industrial Chemistry:

Fertilizers and manures - Bio-fertilizers- Organic Manures and their importance - Role of NPK in plants - preparation and uses of Urea, Ammonium nitrate, potassium nitrate and super phosphate of lime.

1.3 Contents in Match sticks and match box - Industrial making of safety matches. Preparation and uses of chloroform, DDT, gamhexane and Freon.

UNIT - II

2.1 Carbohydrates:

Classification - structure of glucose - Properties and uses of starch - uses of Cellulose Nitrate - Cellulose acetate.

2.2 Amino Acid and Protein:

Classification of Amino Acids - preparation and properties of Glycine - Classification of Protein based on Physical properties and biological functions

2.3 Primary and Secondary structures of protein (Elementary Treatment only) composition of RNA and DNA and their biological role. Tanning of leather - alum (aluminum tri chloride tanning - vegetable tanning)

UNIT - III

3.1 Electro Chemistry:

Specific and equivalent conductivity - their determination - effect of dilution of conductance.

dissociation constant of weak Electrolyte using Conductance
ions

3.3 PH and determination by indicator method - Buffer solutions - Buffer action - Importance of buffer in the living system - Derivation of Henderson equation.

UNIT - IV

4.1 Paints - Pigments - Components of Paint - Requisites of a good paint. Colour and Dyes - Classification based on constitution and application.

4.2 Vitamins:

Biological activities and deficiency diseases of Vitamin A, B, C, D, E and K - Hormones - Functions of insulin and adrenaline.

4.3 Chromatography - Principles and application of column, paper and thin layer chromatography

UNIT - V

5.1 Drugs- Sulpha Drugs - Uses and Mode of action of Sulpha Drugs -- Antibiotics - Uses of Penicillin, Chloramphenicol, streptomycin. Drug abuse and their implication alcohol - LSD

5.2 Anaesthetics - General and Local Anaesthetics - Antiseptics - Example and their application. Definition and one example each for analgesics antipyretics, tranquilizers, sedatives, causes for diabetes, cancer and AIDS.

5.3 Electrochemical corrosion and its prevention - fuel cells.

APPLIED PRACTICAL CHEMISTRY – I & II

VOLUMETRIC ANALYSIS

- 1) Estimation of hydrochloric acid using std. sulphuric acid
- 2) Estimation of Borax using std sodium carbonate
- 3) Estimation of sodium hydroxide using std sodium carbonate.
- 4) Estimation of FeSO_4 using std. Mohr salt Solution.
- 5) Estimation of Oxalic acid using std FeSO_4
- 6) Estimation of FAS using Std oxalic acid
- 7) Estimation of Fe^{2+} using diphenylamine / N phenyl anthranilic acid as indicator.

ORGANIC ANALYSIS:

Reactions of aldehyde (aromatic), carbohydrate, carboxylic acid (mono and dicarboxylic), phenol, aromatic primary amine, amide and diamide. Systematic analysis of organic compounds containing one functional group and characterization by confirmatory tests.

ALLIED

PAPER – 1

BOTANY – I

UNIT-I: Cell Biology

Prokaryotic and Eukaryotic cell (plant cell)
Cell organelles - Chloroplast, Mitochondrion and Nucleus.
Cell division – Mitosis.

UNIT-II: Anatomy

Tissues - Meristematic and permanent tissues. Primary and Normal Secondary thickening of Dicot stem.

UNIT-III: Bacteria and Viruses

Bacteria - General characters - shape - flagellation - Structure of E. Coil - reproduction - (Vegetative and asexual), Economic importance. Structure of Tobacco Mosaic Virus, Bacteriophage.

UNIT-IV: Structure and Life History of

- a) Chlorella and Gracilaria
- b) Albugo, Penicillium and Agaricus

UNIT-V: Structure and Life History of

- a) Funaria
 - b) Lycopodium
 - c) Cycas
- Economic importance of Chlorella, Penicillium and Agaricus.

**ALLIED
PAPER – 2
BOTANY – II**

UNIT-I: Taxonomy

General outline of Bentham and Hooker's system of classification. Study of the range of characters and economic importance of the following families: Annonaceae, cucurbitaceae, Apocynaceae, Euphorbiaceae and Liliaceae.

UNIT-II: Embryology

Structure of mature anther. Structure of mature ovule and its types. Fertilization.

UNIT-III: Plant Physiology & Plant Tissue Culture

Physiological role of micro and macro elements their deficiency symptoms Photosynthesis - light reaction - Calvin cycle Respiration - Glycolysis - Krebs's cycle - electron transport system. Growth hormones – Auxins. Tissue culture and its principles.

UNIT-IV: Ecology

Ecosystem - fresh water ecosystem. Environmental pollution. Major pollutants - types of pollution - Air pollution, water pollution, soil pollution - control measures.

UNIT-V: Genetics & Evolution

Mendelism - Monohybrid and dihybrid crosses. Theories of evolution - Lamarckism, Darwinism.

APPLIED PRACTICAL BOTANY – I & II

Description of plants in technical terms belonging to the families mentioned in the theory part.

To study the internal structure of Anatomy material, Pteridophytes and Gymnosperms.

Identification and Description of Micro Preparation materials mentioned in the theory part.

Description of experimental setup of plant physiology.

BOOKS SUGGESTED

Ashok Bendre, A.K. and Pandey P.C. (1975) Introductory Botany. Rastogi Publication Meerut.

Ganguly, A.K. and Kumar. N.C. (1971) General Botany Vol. I & Vol. II, Emkay Publication, Delhi.

Rev. Fr. Ignacimuthu, S.J. (1975) Basic Biotechnology – Tata Mcraw till publication co., New Delhi.

Rao, K.N. Krishnamoorthy, K.V. and Rao. G. (1975) Ancillary Botany. S. Viswanathan Private. Ltd., Chennai.

ALLIED – 1

PAPER – 1

ECONOMIC ENTOMOLOGY – I

Objectives:

To study the insect pests and their control measures.

To study the economic importance of insects as vectors, pollinators, predators & parasites.

UNIT – I

Classification of insects [Major orders]

Biology of Butterfly

UNIT – II

Beneficial insects. Mode of life, economic importance and development.

Honey bee

Silk worm (Bombyx Mori)

Silk worm [Bombyx mori] rearing

Equipment required

Rearing procedure to harvesting of cocoons.

UNIT – III

Harmful insects

An account of any three pests of :

Rice 2. Cotton 3. Coconut

UNIT – IV

Principles and method of pest control – conventional, Physical, Mechanical, Chemical and Biological control

UNIT – V

Vector borne diseases. A brief account of insect vectors affecting the health of man and domestic animals.

B. Vasantharaj David and T. Kumaraswami 1982. Elements of Economic Entomology, Popular book Depot, Chennai.

Nayar, K.K., Ananthakrishnan, T.N. and B.V. David, V 1992 General and Applied Entomology Tata McGraw, New Delhi.

P.G. Fenemore Manual. Silkworm Rearing. FAO Agricultural Service Bulletin, Rome.

ALLIED – 2

PAPER – 2

ECONOMIC ENTOMOLOGY – II

Objectives:

To study the basic concepts of pesticides and integrated pest control

UNIT – I

Insects and their interrelations with environments, insects as Pollinators parasitoids, Scavengers and weed killers.

UNIT – II

Classification of insecticides – based on mode of action, contact, systemic, fumigants, nerve and stomach poison. Biological control. Integrated pest control.

UNIT – III

Basic principles of insecticide formulation and their application in pest control – plant protection appliances used – working and application.

UNIT – IV

Precautions in handling of pesticides. Pesticides and environmental pollution.

UNIT – V

Assessment to pest population, Estimation of pest damage – pest outbreak – pest surveillance.

Reference Books:

B. Vasantharaj David and T. Kumaraswami 1988. Elements of Economic Entomology. Popular book Depot, Chennai.

Nayar, K.K., AnanthaKrishnan, T.N. and B.V. David 1992 General and applied Entomology Tata McGraw, New Delhi.

P.G. Fenemore, Alka Prakash 1997 Allied Entomology, Wiley Eastern Ltd. New York.

Wigglesworth J.B., 1994. Insect physiology, Chapman and Hall, London.

Temphare D.B., 1984. A Text Book of Insect Morphology, physiology and Endocrinology. S. chand and co., New Delhi.

APPLIED PRACTICAL

ECONOMIC ENTOMOLOGY – I & II

I. MAJOR PRACTICAL

Model / chart – Draw and comment

Life cycle of Holometabolous, Hemimetabolous and Ametabolous Insects [Atleast one example in each]

Insect formulations and plant protection appliances.

II. MINOR PRACTICAL

Mounting

Mouth parts – Bed Bug, Mosquito and House fly

Sting apparatus of Honeybee.

III. SPOTTERS

Pests of agricultural Importance – citrus Butterfly, Rhinoceros beetle, Stem borer – Rice, Sugar cane, Chola, Cotton, Fruit borer, Root borer, six spotted beetle, grasshopper, Crickets, Pod Borer [pulses], Rice weevil, Mango nut weevil. Pest of Medical Importance – Mosquito, Housefly, cockroach, Ticks, Mites, Louse, Bed Bug, Plasmodium, Filarial Worm, Loa Loa, Dust mite.

IV. RECORD

Collection and preservation of insects – insect store box

Note: The Students may be asked to submit a minimum of 10 whole mounts of the insects.

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CORE PRACTICAL – I **Invertebrata and Chordata**

Time : 3hrs

Max.Marks :60

Major Dissection	25 marks
Minor Dissection / Mounting	10 marks
Spotters (5x3 marks) one from each heading	15 marks
Record	10 marks
	<hr/>
	60 marks

CORE PRACTICAL – II **Cell and Molecular Biology, Genetics and Biotechnology**

Time : 3hrs

Max.Marks :60

Major Practical (Cell Biology)	25 marks	
Minor Practical (Microscopic Preparation)	10 marks	
Spotters 5 x 3 marks	}	15 marks
Cell Biology – 2		
Genetics – 1		
Biotechnology - 2		
Record	10 marks	
	<hr/>	
	60 marks	

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CORE PRACTICAL – III

Animal physiology, Developmental Biology and Immunology

Time : 3hrs

Max.Marks :60

Major Practical (Animal Physiology)	25 marks
Comment on the development of Chick embryo (any one stage)	10 marks
Spotters (5x3 marks)	}
Animal Physiology - 1	
Developmental Biology – 2	
Immunology – 2	
Record	10 marks
	<u>60 marks</u>

CORE PRACTICAL – IV

Environmental Biology and Economic Zoology

Time : 3hrs

Max.Marks :60

Major Practical (Environmental Biology)	25 marks
Comment on the Economic Importance of any two prepared slides / specimens (2x5 marks)	10 marks
Spotters (5x3 marks)	}
Environmental Biology -2	
Economic Zoology - 3	
Record	10 marks
	<u>60 marks</u>