

Annexure No.	27 A
SCAA Dated	29.02.2008

BHARATHIAR UNIVERSITY :: COIMBATORE – 641 046

**REGULATIONS FOR M. Sc., ZOOLOGY DEGREE COURSE WITH
COMPULSORY DIPLOMA IN POULTRY SCIENCE AND MANAGEMENT /
DIPLOMA IN COMMUNITY HEALTH
Semester System
(with effect from 2007-2008)**

1. Eligibility for Admission to the Course

A candidate who has passed the B.Sc. Zoology / Animal Science & Biotechnology / Animal Sciences / Advanced Zoology and Biotechnology / Applied Sciences / Life Sciences Degree Examination as main subject of study of this University or an examination of some other University accepted by the syndicate as equivalent thereto shall be eligible for admission to the Master Degree of this University.

2. Duration of the Course

This Course of Study shall be based on Semester System. This Course shall consist of four Semesters covering a total of two Academic Years. For this purpose, each Academic Year shall be divided into two Semesters; the first and third Semesters; July to November and the second and the fourth Semesters; December to April. The Practical Examinations shall be conducted at the end of even Semester.

3. Course of Study

The Course of the Degree of Master of Science/Arts/Commerce shall be under the Semester System according to the Syllabus to be prescribed from time to time. This Course consists of Core Subjects and Elective Subjects. There shall be one Paper on applied Skill Oriented, subject preferably in each semester as part of the adjunct Diploma Programme.

4. Requirement to appear for the Examinations

- a) A candidate will be permitted to take the University Examination for any Semester, if
 - i) he/she secures not less than 75% of attendance out of the 90 instructional days during the Semester.
- b) A candidate who has secured attendance less than 75% but 65% and above shall be permitted to take the Examination on the recommendation of the Head of the Institution to condone the lack of attendance as well as on the payment of the prescribed fees to the University.
- c) A candidate who has secured attendance less than 65% but 55% and above in any Semester, has to compensate the shortage of attendance in the subsequent Semester besides, earning the required percentage of attendance in that Semester and take the Examination of both the Semester papers together at the end of the latter Semester.
- d) A candidate who has secured less than 55% of attendance in any Semester will not be permitted to take the regular Examinations and to continue the study in the subsequent

Semester. He/she has to re-do the Course by rejoining the Semester in which the attendance is less than 55%.

e) A candidate who has secured less than 65% of attendance in the final Semester has to compensate his / her attendance shortage in a manner to be decided by the Head of the Department concerned after rejoining the Course.

5. Restriction to take the Examinations

a) Any candidate having arrear paper(s) shall have the option to take the Examinations in any arrear paper(s) along with the subsequent regular Semester papers.

b) Candidates who fail in any of the papers shall pass the paper(s) concerned within 5 years from the date of admission to the said Course. If they fail to do so, they shall take the Examination in the revised Text / Syllabus, if any, prescribed for the immediate next batch of candidates. If there is no change in the Text / Syllabus they shall take the Examination in that paper with the Syllabus in vogue, until there is a change in the Text or Syllabus.

In the event of removal of that paper consequent to the change of Regulations and / or Curriculum after a 5 year period, the candidates shall have to take up on equivalent paper in the revised syllabus as suggested by the chairman and fulfill the requirements as per Regulations/Curriculum for the award of the Degree.

6. The Medium of Instruction and Examinations

The medium of instruction and Examinations shall be in English.

7. Submission of Record Notebooks for Practical Examinations

Candidates taking the Practical Examinations should submit bonafide Record Note Books prescribed for the Practical Examinations. Otherwise the candidates will not be permitted to take the Practical Examinations.

8. The Minimum (Pass) Marks

A candidate shall be declared to have passed in a paper if a student obtains not less than 50% of marks in that paper. A candidate shall be declared to have passed the whole Examination if the student passes in all the papers.

9. Improvement of Marks in the subjects already passed

Candidates desirous of improving the marks secured in their first attempt shall reappear once within the subsequent Semester. The improved marks shall be considered for classification but not for ranking. If there is no improvement there shall not be any change in the original marks already awarded.

10. Classification of successful candidates

A candidate who passes all the Examinations in the first attempt within a period of two years securing 75% and above marks in the aggregated shall be declared to have passed with First Class with Distinction.

Successful candidates passing the P.G. Degree Examinations, securing 60% marks and above shall be declared to have passed the examination in First Class. All other successful candidates shall be declared to have passed the Examination in Second Class.

11. Ranking

A candidate who qualifies for the PG Degree Course passing all the Examinations in the first attempt, within the minimum period prescribed for the Course of Study from the date of admission to the Course and secures 1st or 2nd Class shall be eligible for ranking and such ranking will be confined to 10% of the total number of candidates qualified in that particular subject to a maximum of 10 ranks.

The improved marks will not be taken into consideration for ranking.

12. Conferment of the Degree

No candidate shall be eligible for conferment of the Degree unless he / she has undergone the prescribed Course of Study for a period of not less than four Semesters in an Institution approved of by and affiliated to the University or has been exempted there from in the manner prescribed and has passed the Examinations as have been prescribed.

13. Evening College

The above Regulations shall be applicable for candidates undergoing the respective Courses in the Evening Colleges also.

14. Revision of Regulations and Curriculum

The above Regulation and Scheme of Examinations will be in vogue without any change for a minimum period of three years from the date of approval of the Regulations. The University may revise /amend/ change the Regulations and Scheme of Examinations, if found necessary.

15. Transitory Provision

Candidates who have undergone the Course of Study prior to the Academic Year 2007-2008 will be permitted to take the Examinations under those Regulations for a period of four years i.e. up to and inclusive of the Examination of April 2012 thereafter they will be permitted to take the Examination only under the Regulations in force at that time.

M. Sc., ZOOLOGY (Colleges)
with Compulsory DIPLOMA IN COMMUNITY HEALTH
(For the students admitted During the Academic Year 2007-2008 Batch & Onwards)
SCHEME OF EXAMINATION

Sem	Subject and Paper		Instruc- tional Hrs Per Week	University Examinations			
				Duration in Hrs	EXT	CIA.	Total
I	Paper I	Animal Physiology	6	3	75	25	100
	Paper II	Molecular Cell Biology and Biotechnology	6	3	75	25	100
	Paper III	Genetics and Evolution	6	3	75	25	100
		Diploma Theory Paper I	4	3	75	25	100
II	Paper IV	Ecology and Quantitative Biology	6	3	75	25	100
	Paper V	Biochemistry, Biophysics and Bioinformatics	6	3	75	25	100
	Paper VI	Experimental Embryology and Immunology	6	3	75	25	100
		Diploma Theory Paper II	4	3	75	25	100
	Practical I	Comprises of papers I, II and III	4	4	75	25	100
	Practical II	Comprises of papers IV, V and VI	4	4	75	25	100
III	Paper VII	Microbiology	5	3	75	25	100
	Paper VIII	Animal Behaviour	5	3	75	25	100
	Paper IX	Optional Subject I-Entomology I	4	3	75	25	100
	Paper X	Optional Subject I- Entomology II	4	3	75	25	100
		Diploma Theory Paper III	4	3	75	25	100
IV	Paper XI	Biodiversity	5	3	75	25	100
	Paper XII	Recent Trends in Zoology	5	3	75	25	100
	Paper XIII	Optional Subject II-Paper II	4	3	75	25	100
	Paper XIV	Optional Subject II-Paper II	4	3	75	25	100
	Practical III	Optional Subject I - Entomology	4	4	75	25	100
	Practical IV	Optional Subject II	4	4	75	25	100
		Diploma Practical Comprises Diploma Theory Papers	4	4	75	25	100
		Total Marks	M. Sc., Zoology Diploma Course				1800 +400

I. M.Sc., SEMESTER – I ANIMAL PHYSIOLOGY

UNIT I

Nutrition

Metabolism of (i) Carbohydrates, (ii) Proteins and (iii) Lipids

Respiration

Factors affecting Oxygen consumption – Respiratory centre – Control of respiration by PCO₂, PO₂ & pH. Oxygen therapy. Regulation of respiration during exercise.

UNIT II

Circulation

Heartbeat

Blood Pressure and hypertension

Blood Components and their functions

Cardiac cycle

Excretion

Regulation of excretion. Fluid system of the body and constituents of extra cellular & intracellular fluids. Edema. Regulation of body fluids by kidney. Mechanism of urine formation.

UNIT III

Nervous & Chemical coordination

Physiology of nerve impulses, transmission, membrane receptors and neurotransmitters

Sense organs

Photoreceptors

Phonoreceptors

Chemoreceptors

Mechanoreceptors

Hormones – function – interactions. Hormonal regulation of metabolism & vertebrate reproduction

UNIT IV

Muscular system

Muscular contraction – mechanism – theories

Chemistry of muscles.

Neural control of muscles. Muscle metabolic systems in exercise & recovery.

UNIT V

Chronobiology

Homeostasis – Physiological adaptations at high altitudes & deep sea

Osmo and ionic regulations

Thermoregulations

Biological rhythms – Seasonal adaptations (Dormancy, Diapause and photoperiodism)

Biological Clock.

REFERENCE:

1. Text book of Medical Physiology – C.Guyton.
2. Text Book of Physiology – William S. Hoar
3. Animal Physiology – Sastri and Goel
4. Physiology – Prosser and Brown
5. Animal Physiology – A.K. Berry
6. Human Physiology – Chakrabarti Ghosh & Sahana
7. Animal Physiology – Agarwal & Usha Gupta

PAPER - II
MOLECULAR CELL BIOLOGY AND BIOTECHNIQUE

UNIT I

Nucleus

Chromosomes - Giant Chromosomes - Cell cycle - Interphase nucleus

Chromosomal movement during cell division

UNIT II

DNA

DNA – Structure and chemistry - Nuclear DNA amounts and C value

Satellite DNA and its functions - Mobile DNA (Transposable elements)

UNIT III

Protein Synthesis

DNA Template - RNA Types – their structure and functions

Transcription - Translation - Post translational modifications.

Special Changes and acceptance

Biogenesis of Mitochondria, Mitochondrial genome and its function

Biology of Cancer, Biology of Aging

UNIT IV

Bioinstrumentation – Principle and use

pH Meter, Calorimeter, Spectrophotometer, Ultra Centrifuge

Radioactivity counter

Cell culture

Cell culture techniques

Cell proliferations measurements

UNIT V

Cytotechniques

Preservation of cell and tissues

Drying and preservation of physiologically active substances.

Autoradiography.

An introduction to Separation techniques

Chromatography, Electrophoresis

Precipitation

Centrifugation

Cell Separation

REFERENCE:

- | | | | |
|----|-------------------------------|------|-----------------------------------|
| 1. | De Robertis ED P <i>et al</i> | 1987 | Cell and Molecular Biology |
| 2. | Alberts B <i>et al</i> | 1986 | The molecular biology of the cell |
| 3. | Watson J D <i>et al</i> | 1987 | Molecular Biology of the Gene |

PAPER - III - GENETICS & EVOLUTION**UNIT I*****Inheritance***

Gene concepts – Classical theory – Modern theory

Multiple alleles- Blood group inheritance

Extra chromosomal inheritance

Genetic recombination

Types of recombination, Molecular events during recombination

Genetic recombination in Bacteria (Transformation, conjugation, transduction, episomes and plasmids)

UNIT II***Mapping of chromosomes***

Eukaryotic, Bacterial, Viral, Bar loci, Complex locus and Complementation mapping

Gene regulation

Operon concept - The repressor, operator and promotor genes

Developmental genes – control of gene expression and sequential gene expression in eukaryotes.

UNIT III***Population genetics and molecular evolution***

Hardy-Weinberg law of genetic equilibrium

Destabilizing forces – Natural selection, Mutation, Genetic drift, Migration and Meiotic drive. Patterns of change in nucleotide and amino acid sequences

Molecular Evolution

Gene evolution – Assessment of molecular variations

UNIT IV***Genetics of Speciation***

Patterns and mechanisms of reproductive isolation

Models of speciation (Allopatric, Sympatric and Parapatric)

Phylogenetic gradualism & punctuated equilibrium.

UNIT V***Origin of higher categories***

Major trend in the origin of higher categories

Micro and Macro evolution

Modern evolution

Prospects and control of human evolution

Eugenics – Metapopulation and loss of genetic variations.

REFERENCES:

- | | | | |
|----|---------------------------|------|--------------------------------|
| 1. | Mitra Sardhya | 1994 | Genetics |
| 2. | Stickberger | 1974 | Genetics |
| 3. | Gardiner E J <i>et al</i> | 1984 | Principles of Genetics |
| 4. | Sarin C | 1985 | Genetics |
| 5. | Dobzhansky Th | 1969 | Genetics and Origin of species |
| 6. | Hart D L | | Population Genetics |
| 7. | Jha A P | 1995 | Genes and Evolution |
| 8. | Merrwl D J | | Evolution and Genetics |
| 9. | Smith J M | 1992 | Evolutionary Genetics |

I. M.Sc., SEMESTER - II
PAPER – IV

ECOLOGY & QUANTITATIVE BIOLOGY.

UNIT I

Ecosystems

Fresh water

Coral reef

Forest

Estuary

Energy flow – of the above ecosystems.

Community Ecology

Organisation

Stratification – Community stability.

Food chain

Food web

Ecological succession.

UNIT II

Population Ecology

Growth

Fluctuations

Cycle and Equilibrium

Intraspecific and interspecific relationships.

Factoral Ecology

Physico-chemical factors – Light, Temperature, Salinity and Oxygen.

Biogeochemical cycles – Water, Nitrogen, Carbon, Sulphur and Phosphorus.

UNIT III

Biological data

Source

Collection – Classification – Tabulation

Diagrammatic representation

Frequency curves

Frequency Polygon

Ogive

Measurements and variables

Central tendency

Arithmetic mean – Median – Mode

Dispersions

Deviations

Co-efficient of variance

Standard Deviations and standard error.

UNIT IV***Test of Samples***

Sampling, distribution of samples and sampling errors.

Student "t" test

Chi-square test.

Test of Significance

Large samples

Small samples

UNIT V***Correlation & Regression***

Types

Karl Pearson's co-efficient

Calculation of regression co-efficient and Significance test.

Probability

Definition

Types

Additional and Multiplication theorems

REFERENCE:

1. Odum, E. Fundamentals of Ecology W.B. Saunders, London.
2. Clarke, S. Ecology
3. Krebs, C.J. Ecology
4. Pielon, E.C. Population and Community Ecology
5. Knight, F. Concept of Ecology. Kings Pub. Co. Victoria.
6. Dash.M.C. Fundamentals of Ecology.
7. Batschelet E Introduction to mathematics for life scientists Springer-Verlag, Berling
8. Sokal R R & Rohlf F J Biometry Freeman, San Francisco
9. Jorgenson S E Fundamentals of Ecological Modeling Elsevier, New York.
10. Gupta S P Statistical Methods Chand & Co, Delhi.
11. Sokal R R & Rohlf F J Biostatistics Freeman, San Francisco
12. Snedecor G W & et al Statistical Methods East-West Press, Delhi.
13. Zar J H Biostatistical Analysis Prentice Hall, London.
14. Shiv Kumar Practical Statistics Chand & Sons, Delhi.
15. Rama Krishnan P Biostatistics Saras Pub., Nagarcoil.

PAPER - V
BIOCHEMISTRY, BIOPHYSICS AND BIOINFORMATICS

Biochemistry

UNIT I

Classification & structure of

Carbohydrates.

Proteins.

Lipids.

Cellular metabolism

Thermodynamics of Cellular reactions and redox potential.

Energy rich compounds and their biological significance.

UNIT II

Nucleic Acids

Structure

Synthesis

Degradation

Enzymes, Isoenzymes and Co-enzymes

Classification

Mechanism of action

Significance

Biophysics

UNIT III

Principles of Optics and Light

Microscopy

Principle and use of – Light ,Interference.,Phase Contrast and Electron (TEM & SEM)

Microscopes.

Radiation

Electromagnetic radiation

Biological application of – X –rays, Infrared rays, UV rays.

UNIT IV

Bioelectricity Theory

Membrane Potential -(Resting and action Potential)

Ionic distribution and Membrane Potential

Recording of action Potential

Nerve Impulses

Description of Nerve impulse

Conduction and rate of transmission

UNIT V

Computer applications

Introduction on computers and their application to biology.

Operating systems – WINDOWS (Excel, PowerPoint, Word – Basics only)

Principles and applications.

Internet

Databases and information retrieval.
Basics of Database management.

REFERENCE:**Biochemistry**

- | | | | |
|----|---------------------------|------|-----------------------------------|
| 1. | Stryar.L. | 1988 | Biochemistry |
| 2. | Lehnigar. A.L. | 1982 | The Principles of Biochemistry |
| 3. | Abraham Mazur. | 1966 | Text Book of biochemistry. |
| 4. | Voet.D & Voet.J.G. | 1997 | Biochemistry |
| 5. | Hawk | 1996 | Practical Physiological Chemistry |
| 6. | Garrett.R.H. <i>et al</i> | 1996 | Biochemistry |

Biophysics

- | | | | |
|----|-------------|------|-------------------------------|
| 1. | Giese. A.C. | 1969 | Cell Physiology |
| 2. | Casey. | 1993 | Biophysics |
| 3. | Deb.A.C. | 1983 | Fundamentals of biochemistry. |

Bioinformatics

- | | | | |
|--|----------------------------|------|-----------------------|
| | Yaswant Khanitkar | 1992 | Computer Languages |
| | Christopher Cavanaugh | 2001 | Computer Hints & Tips |
| | Bipin C Desai <i>et al</i> | 1999 | Database Management |
| | Mani.K & Vijayaraj.N. | 2001 | Bioinformatics. |

PAPER - VI**EXPERIMENTAL EMBRYOLOGY AND IMMUNOLOGY****UNIT I*****Fertilization***

Theories of fertilization,
Process and significance of fertilization
Artificial insemination
Collection and cryopreservation of gametes & embryos
Embryo transfer technology
Invitro fertilization
Induced ovulation
Teratology – causes types & events

UNIT II***Embryonic nutrition***

Yolk utilization
Types of placenta, Placental hormones
Physiology of placenta
Hormonal control of pregnancy and lactation

Induction and Organizer

Nature of induction and organizer
Physiology of induction
Experiments on inductions
Nucleoplasmic interactions

UNIT III**Outlines of Immunology**

Basics of immunity – Types of immunity – Lymphoid organs – Structure and types of Immune system.

Immunoglobulin – Structure, biological properties and functions

UNIT IV**Cells, tissues and organs of immune system**

Primary and secondary lymphoid organs structure and their functions.

Cells of Immune system: Their maturation, activation, differentiation and functions.

Types of Immunity:

- a. Innate immunity
- b. Humoral immunity: Antigen their types; adjuvananes, epitopes as antigenic determinants; Process of antigenicity.
Antibodies (Immunoglobulins) classes and structure, Antigen and Antibody interations. Theories of antibody formation.
- c. Cellular immunity: Major and minor histocompatibility (MHC) complexes: HLA system; clinical significance of MHC & HLA

UNIT V**Immunoresponse and its regulation**

Primary and secondary immunoresponse.

Immunocompetence of embryo

Hypersensitivity I, II, III & IV types with suitable examples.

Transplantation immunity – skin graft rejection

Immunoresponse to tumour antigens

Immunodiagnostic assays – ELISA, RIA; Vidal tests and their applications.

Vaccines: Types; preparation; Active and passive immunization

REFERENCE:***Development biology and Experimental Embryology***

- | | | | |
|----|---------------------|------|--|
| 1. | Balinsky B L | 1970 | An Introduction to Embryology |
| 2. | Reven Ch P | 1858 | Morphogenesis |
| 3. | Barth L G | 1959 | Embryology |
| 4. | Reven Ch P | 1959 | An outline of developmental Physiology |
| 5. | Rugh R | 1952 | Experimental Embryology |
| 6. | Robert <i>et al</i> | 1957 | Experimental in developmental biology |

Immunology

- | | | | |
|----|-------------------------|------|----------------------------|
| 1. | Pawar <i>et al</i> | 1984 | General Microbiology |
| 2. | Roitt I | 1986 | Essential Immunology |
| 3. | Boyd W C | 1981 | Fundamental of Immunology |
| 4. | Wieser R S <i>et al</i> | 1971 | Fundamentals of Immunology |

PRACTICAL – I
I. M.Sc.,

Animal Physiology Practicals

1. Determination of the rate of activity of salivary amylase (Human saliva) activity by titration method.
 - Ptyalin Activity in relation to temperature and calculation of Q_{10} .
 - Ptyalin activity in relation pH and calculation of Q_{10} .
 - Recording of diastolic and systolic pressure during, standing, sitting & lying posture.
2. Biological responses of animals to various osmotic concentrations and their effects.
 - a. Change in weight of Earthworm in heteroosmotic media.
 - b. Pattern of osmotic responses of crab in heterosmotic media.
 - c. Active uptake of Na^+ and Cl^- of a fish from the environmental water and change in salinity.
3. Determination of uptake and excretion of ammonia in the given medium by a fish.
4. Determination of the specific gravity of the blood of a vertebrate animal-by copper sulphate method.
5. Effect of temperature on the Oxygen consumption of fish and calculation on Q_{10} .
6. Determination of total count of RBC in Human Blood.
7. Determination total and differential count of WBC in Human Blood.

Molecular cell Biology Practicals

1. Mounting of Polytene chromosome from the salivary gland of Chironomous Larva.
2. Squash preparation of testis of grasshopper to study the stage of Meiosis.
3. Isolation of DNA and RNA from an animal tissue (Demonstration only)
4. Study of different cells from the vertebrate animal. (Brain, Liver, Gonad, Kidney and Muscle)

Biotechniques Practicals

1. Microtomy and histochemistry – Preparation of slides and staining technique (Demonstration only).
2. Separation technique of amino acids using paper chromatography. (Demonstration only).
3. Separation of Proteins on gel electrophoresis. (Demonstration only)
4. Study on the Principles of the Instruments and their uses.
 1. pH Meter.
 2. Colorimeter
 3. Spectrophotometer.
 4. Electrophoresis apparatus.

Genetics Practicals

1. Genetic characteristics of a class room sample. Finger print, ear lobe, tongue rolling, mid digital hairs, widow's peak, inward bending of little finger
2. Culture of Drosophila and identification of mutant characters. (from the given sample).

Evolution Practicals

1. Study on the homology of a group of vertebrates on the Limb skeleton.
2. Study of mimicry, colouration among animals (Insects).

PRACTICAL – II**I. M.Sc.,*****Ecology Practicals***

1. Water analysis and estimation of the following substances
a. Calcium b. Magnesium c. Phosphate d. Silicate e. Nitrate
2. Quantitative analysis of Planktons (Fresh water / Marine)
3. Identification of Marine and Freshwater Plankton from the slides.
4. Effect of salinity on oxygen consumption of fish.

Biochemistry Practicals

1. Qualitative study of Carbohydrates, Proteins and Lipids from the given samples.
2. Preparation of Haemin Crystals from the blood of Vertebrates.
3. Quantitative estimation of Haemoglobin from the blood of vertebrates.
4. Separation of plasma, Serum and cells from blood.

Quantitative Biology Practical

1. Calculation of (a) Frequency polygon (b) Histograms from the Data given
(The basic data may be from any material available around)
2. Calculation of (a) Standard deviation and (b) Correlation and (c) Student's test from the given data.

Biophysics Practical

1. Determination of viscosity of the given liquid (Ostwald's Method)
2. Determination of Glucose content of a given sample. (Calorimeter method)

Embryology Practical

1. Induced Ovulation in Frog (Demonstration only)
2. Effect of Thyroxin on the growth of tadpoles. (Demonstration only)
3. Study of Embryonic developmental stages (Frog and Chick)

Immunology Practical

1. Study of Antigen and Antibody reaction through the study of Blood grouping.
2. Study of Rh factor through the study of Blood grouping.

A study tour to various places of ecological importance is essential. A tour report should be submitted along with the record.

SEMESTER: III - PAPER VII MICROBIOLOGY

UNIT I

Basics on Microbiology

History

Scope

Koch's postulates on Prokaryotes and Eukaryotes (Types and Characters)

Classification and examples

Viruses

Mycoplasma – Bacteria – Cyanobacteria – Actinomycetes

Microalgae – Microfungi

Protozoa

Wittaker's 5-kingdom concept

UNIT II

Bacteriology-Classification

Morphological types

Gram positive and negative bacteria

Structure and growth

General structure

Flagella and Pili

Reserve food material

Nuclear material

Cell division

Endospore and nutritional types

Growth phase

UNIT III

Virology

Viruses and Bacteriophages (Bacterial, Plant and Animal)

Outline structure and characters

Lytic and lysogenic cycles

HIV – a brief account

Protozoology

Protozoans (Clinical and Veterinary importance)

Structure

Biology

Significance

UNIT IV

Industrial Microbiology

Fermentation Products – Microbes in industry

Enzymes

Antibiotics

Alcohols

Commercial importance of Fermentation products

Fermentation process of ethyl alcohol

Fermentation process of Penicillin

Dairy and Food Microbiology

Pasteurization – Milk

Other Products (Curd, Butter, Ghee and cheese)

Food preservation – Physico-chemical methods

Fermented food – food spoilage and food poisoning

UNIT V***Medical Microbiology***

Study of common bacterial and viral diseases of man

Causative organisms – basic structure and toxicity, symptoms and their preventive measures

Diseases

Diseases of gastroenteric system – Cholera, Typhoid and Hepatitis

Respiratory system – Diphtheria, Whooping cough, pneumonia and tuberculosis

Nervous system – Leprosy, Tetanus, poliomyelitis, Rabies

Genital system – Gonorrhoea and Syphilis, AIDS

(Visit to Industries to Microbiological importance may be undertaken)

Reference

1. Pelczar Jr M.J.Chan, E.C.S. 1993. Microbiology Tata Mc Graw Hill Company
2. P. Chakraborty 1995. A Text book of Microbiology New Central Book Agency P Ltd., Calcutta 700 009, India.
3. P.D. Sharma, Microbiology
Aantha Narayanan & Jayaram Panicker Microbiology

PAPER - VIII
ANIMAL BEHAVIOUR

UNIT: 1***Introduction and causes of behavior***

1. Adaptive value of behaviour
2. Habituation and conditioning
3. Instinct versus learning

UNIT: II***Communication and Programmed Behaviour***

1. Visual communication – Dance language of honey bee; Mating dance of birds.
2. Auditory (Sound/Vocal) communication – songs of birds and sounds of mammals.
3. Chemical communication – Pheromones of insects; Pheromones of mammals
4. Migration of fishes and birds; Navigation, animal orientation and echolocation.

UNIT: III***Introduction to Sociobiology***

1. Social behaviour – habitat selection; dominance hierarchy
2. Territoriality; Aggregation; Social competition; Aggression and cannibalism
3. Social training – Schooling in fishes; flocking in birds; societies in primates.

UNIT: IV***Reproduction Behaviour***

1. Mating – Selection and mate choice
2. Dance, courtship and natal behaviour in mammals
3. Parental care – in fishes; in birds and in mammals.

UNIT: V

1. Hormonal control of animal behaviour
2. Human behaviour – Neuronal control; mania; excitement and depression; schizophrenia; Alzheimer disease.
3. Genetic and environmental components of behaviour;

REFERENCES

(FOR PAPER VIII: ANIMAL BEHAVIOUR)

Alcock, J. 1984; Animal behaviour: An evolutionary approach. Sinauer Associates Inc. Publ. Sunderland, Mass. USA.

Bradbury, J.W., and S.L. Vehrencamp. Principles of animal communication Sinauer Associates Inc. Publ. Mass. USA.

Drickamer and Vessey. Animal behaviour concepts, processes and methods. Wardworth Publ.

Eibl-Eibesfeldt, I. 1970. Ethology: The biology of behaviour; Holdt, Reinhardt and Winston, New York.

Gould, J.L. 1982. Ethology: The mechanism and evolution of animal behaviour. W.W. Norton and Company, NY., London.

Chandrasekaran, M.K., G. Fleissner and G. Neuweiller, 1987. Animal Behaviour; Bask experiments in Neurophysiology, Macmillan, India.

Eckert, R.D. Randall and G. Augustine. 1988. Animal Physiology; Mechanisms and adaptations. III. Eds. W.H. Freeman and Company, N.Y.

Hauser, M. The evolution of communication. MIT Press, Cambridge, Massachusetts, USA.

Hinde, R.A. Animal behaviour; A synthesis of Ethology and comparative psychology. Mc Graw-Hill, New York.

Krebs, J.R. and N.B. Davis. 1987. An introduction to behavioural ecology; Blackwell Scientific Publications, Oxford.

McFarland, D. 1985. Animal behaviour; Psychobiology. Ethology and Evolution, Pitman Publ. Ltd., London.

Mekeon, B.A. 1984. Fish migration, Chapman and Hall, London.

Strickberger, H.W. 1985. Genetics. III Ed. Macmillan, New York.

Wilson, E.O. 1978. Sociobiology: The new synthesis: President and Fellows of Harvard college, USA.

Wittenberg J.F. 1981. Animal social behaviour. Duxbury Press, Boston.

II M.Sc., ZOOLOGY – SEMESTER: IV
PAPER - XI
BIODIVERSITY

UNIT I

Biodiversity and species concept

Components of Biodiversity – Ecosystem, Genetic and Species diversity

Species Concept – Biogeography and Speciation; Principles of Taxonomy

Animal Diversity

Animal – Distribution, Population inventory, Species richness (Dominance)

Biodiversity Hot spots – Mammals, Birds, Reptiles, Amphibians, Fishes and Invertebrates of Western GHAT region

Indo – Burma regions

Domestic Animals of India –cattle, birds, carnivores like dogs and cat

UNIT II

Loss of animal Diversity (Extinctions)

Past rate of Extinctions – Geological

Island biogeography and extinction rates of islands – Island Fauna

Human induced extinctions – Habitat loss, Degradation, Fragmentation, Population reduction, Threats

Status of Species

Isolated species – Rate, Endemic and Threatened towards extinctions

Wild species – Measurement, IUCN Red list of Indian wild life

UNIT III

Conservation Biology

Case Studies – In situ and Ex situ conservation of Indian animals

Population management – Project Tiger and Elephants;

Communities and Conservation – People participation; Success and failures of conservation action.

Tools in Conservation

Wild life data (Statistics) and methods of interpretation

Wild life maps

Remote sensing in wild life and study of Landscape

Human demography – PVA, CAMP

UNIT IV

Animal Laws and Policies in India

Protected area network Programme

Forest Policy

SPCA Act

Economics of Bioconservation

Convention on biodiversity: Objectives, principles, use of terms in situ and ex situ conservation, sustainable use of components

Convention on International Trade in endangered species – principles, regulation, exemption, signatories
 Negative list of exports – Animals only
 Zoo policy
 Economics of biodiversity conservation

UNIT V

Conservation Education

Wild life / Animal Magazines
 Writing of Popular and Scientific articles on conservation
 Information on wild life – Mass media

Conservation awareness

Wild life celebration days – Games on the conservation of Wild life global programmes on Nature and Environment

Biotechnology in conservation

II M.Sc., ZOOLOGY – SEMESTER: IV PAPER XII : RECENT TRENDS IN ZOOLOGY

UNIT I

Principles and Applications Bio-Instruments

1. Atomic absorption spectrophotometer; ultra-centrifuge.
2. Flow cytometry – cytophotometer
3. Biocensors – types and application; Biochips and their applications

UNIT II

Analytical Techniques and Applications

1. Ion exchange chromatography
2. Gel electrophoresis
3. Immuno-electrophoresis
4. Autoradiography – Principle, method and application
5. Use of radio isotopes in medicine
6. Polymerase Chain Reaction (PCR)
7. DNA Finger Printing and Southern blotting

UNIT III

Applied Molecular Biology

1. Molecular probes and their applications for diagnosis of human diseases.
2. Inherited diseases – diagnosis; gene therapy and its strategies and applications
3. Transgenic animals and veterinary biotechnology
4. Somatic cell hybridization – Mechanism and its applications

UNIT IV

Hazards and Remedies

1. Radiation biology – Basic concepts, radiations exposure; its biological effects; radiation and carcinogenesis; radiation syndrome; its delayed effects on ageing; radiation damage to chromosomes.
2. Genetic disorders – chromosomes and cancer; oncogenes and antioncogenes
3. Prenatal diagnosis of genetics disorders – Inborn errors of metabolism; use of amniocentesis; ultrasonography; foetal DNA analysis; genetic counselling.

- Human genome project: Techniques; Pharmacogenomics; human and animal cloning and its implications.

UNIT V

Environmental Biotechnology

- Bioremediation; *In situ* and *Exsitu* bioremediation; Bioleaching; biofertilizers; degradation of xenobiotics
- Hazards of genetically modified micro-organisms (GMMS) on environment: Ecological risks of transgenic plants and animals.
- Biosafety of biological materials: Guidelines and regulations and laws; intellectual property right (IPR) and protection (IPR): biopiracy and biocolonism – transboundary movement of living and modified organisms and genetics resources – their issues on global level.

REFERENCES

- Bellanti, J. 1985. Immunology. W.B. Saunders., W.B. Saunders, Co. Philadelphia
- Coggle, J.E. 1983. Biological effects of radiation. II Ed. Taylor and Francis Ltd.,
- Dubey, R.C. 2002. A text book of biotechnology. S. Chand and Company Ltd., New Delhi.
- Gabriel Melchias, 2001. Biodiversity and conservation, Oxford IBH Publ. Co. Pvt. Ltd, New Delhi, Calcutta.
- Glazer, A.N. and Hiroshi Nikaido, 1995. Microbial biotechnology: Fundamentals of Applied Biotechnology, W.H. Freeman and Company, New York.
- Gupta, P.K. 2003. Elements of Biotechnology, Rastogi Publ. Meerut.
- Rao, C.V. 2002. An introduction to immunology, Narosa publishing House, New Delhi.
- Leisinger, T. Cook, D.M.J. Meusch and Hutter, 1981. Microbial degradation of xenobiotics and Recalcitrant compounds, Academic Press, London.
- Maniatis, T.E., J. Fritsch and J. Sambrook. 1989. Molecular cloning II Ed. Cold Spring Harbor, New York.
- Marx, J.L. 1989. A revolution in Biotechnology, Cambridge Univ. Press., Cambridge.
- Rigby, P.W.J., 1987. Genetic Engineering, Academic Press, London.
- Stewart-Tull, D.E.S. and M. Sussman. 1992. The release of genetically modified and microorganisms REGEMM, Plenum Press, N.Y.
- Susoman, M.C.H. Collins and F.A. Skinner. 1988. The release of genetically engineered microorganisms, Academic Press, London.
- Swaminathan, M.S. and Jana. 1992. Biodiversity: Implications for global food security, Macmillan, Madras.
- Tizzard, I.R. 1995. An introduction to immunology. IV Ed. Saunders College Publ. New York, Tokyo.
- Upadhyay, A.K. Upadhyay and Niramalendu Nath., 2004. Biophysical chemistry; Principles and Techniques, Himalaya Publ. Mumbai, Delhi.
- Wiseman, A. 1983. Principles of Biotechnology, Chapman & Hall, New York.

II M.Sc., SEMESTER III

OPTIONAL SUBJECT I – PAPER I - ENTOMOLOGY I

UNIT I

Class Insecta

Classification up to order with example for each order

Identification of insects using keys

Insect Collection

Methods
Preservation
Significance

UNIT II

Comparative Morphology

Head
Thorax
Abdomen
Appendages

Functional Morphology

Mouthparts
Genitalia (male, female)

UNIT III

Structure and Physiology

Digestive system
Respiratory system
Circulatory system
Excretory system
Nervous system
Sense organs
Reproductive system

UNIT IV

Integument

Structure
Chemistry
Synthesis of chitin
Sclerotisation
Tanning

Growth

Insect growth
Metamorphosis and its control

UNIT V

Insect Endocrines

Endocrine Glands
Hormones and Neurohormones – their functions

Insect adaptations

Adaptations to environmental stress
Diapauses
Pheromones
Insect flight

II M.Sc., SEMESTER III

OPTIONAL SUBJECT I – PAPER II - ENTOMOLOGY II

UNIT I

Interaction of Insects

Social Insects – Termite, Honey and Ant

Social organisation
Caste differentiation
Social behaviour
Insect – Plant interaction
Insect vector – Host

Bionomics and control measures

- a. Locusta migratoria – Polyphagus grasshopper
- b. Odontotermis obesus – Polyphagus termite
- c. Heliothis armigera
- d. Spodoptera litura – Polyphagus caterpillar
- e. Oryctus rhinocerus – Coconut beetle

UNIT II

Biology and Control measures of Insect pests

Cash crops – Cotton and sugarcane
Storage grains – Paddy, Wheat and Flour

Insect control measures

Chemical
Physical
Mechanical
Cultural
Biological

UNIT III

Insect Vectors

Systematics, Biology and Control measures of Insect vectors of Human diseases
Flies – Anopheles, Culex and Aedes; Musca domestica
Roaches and bugs – Periplaneta americana and Cimex indicus

Insects of Commercial Importance

Honey Bee – types and the differences in nest building, social behaviour and production of Honey.
Silk Moth – types and the differences in life cycles and production of silk
Lac Insect – Indian type only

UNIT IV

Insect Toxicology

Principles and Scope

Chemistry and mode of action of the Insecticides

Inorganic compounds
Organochloride compounds
Organ phosphorus compounds
Carbamates
Botanical Insecticides

UNIT V

Insects and Modern chemicals

Growth regulatory compounds
Microbial insecticides
Pheromones and pest control

Insecticides

Formulation

Application technology

Mechanism of Insecticide resistance – Genetical, Physiological and Biochemical.

Reference

- | | | | |
|----|-------------------|------|---------------------------------|
| 1. | Imms | 1986 | Textbook of Entomology |
| 2. | Snodgrass | 1983 | Insect Morphology |
| 3. | Chapman | 1973 | Insect Structure and Morphology |
| 4. | Wigglesworth | 1969 | Insect Physiology |
| 5. | Alka Prakash | 1996 | Applied Entomology |
| 6. | Ramakrishan Iyer | 1989 | South Indian Insects |
| 7. | Vasantharaj David | 1983 | Economic Entomology |
| 8. | Dennis | 1986 | Entomology |

PRACTICAL – III**OPTIONAL SUBJECT I - ENTOMOLOGY PRACTICAL**

1. **Identification of Insects**
 - a. Key to each order
 - b. One insect for each order (South Indian insects only)
2. **Dissection – Digestive system, Nervous system and Reproductive system**
(Any 6 of the following insects)

a. Cockroach	b. Gryllotalpa
c. Painted Grasshopper	d. Dragonfly
e. Plant bug	f. Nepa
g. Moth	h. Honey bee
i. House fly	j. Cybister
k. Rhinoceros beetle	
3. **Mounting – Mouthparts, Leg, Wing, Salivary gland and Sting apparatus.**
(Any 6 of the following insects)

a. Silver fish	b. Cockroach
c. Gryllotalpa	d. Grasshopper
e. Plant bug	f. Nepa
g. Butterfly	h. Housefly
i. Honey bee	j. Mosquito
k. Bedbug	l. Head louse
4.
 - a. Qualitative study of the digestive enzymes in different regions of the alimentary canal of Cockroach.
 - b. Qualitative study of haemocyte in the haemolymph of cockroach
 - c. Qualitative study of lipids, carbohydrates and proteins in the haemolymph of cockroach.
 - d. Identification of Insect pests of the following (3 major pests in each)
 - i. Paddy ii. Cotton iii. Sugarcane iv. Vegetables v. Storage products
5. **Submission – Insects (preservations)**
 - a. Systematics
 - b. Pests
 - c. Medical importance

- d. Veterinary importance
 - e. Economic importance
 - f. Insect whole mounts – 10 slides
6. Record – A complete record of the works done during the practical hours of the year should be submitted with duly bonafide certificate.

II M.Sc., SEMESTER IV
OPTIONAL SUBJECT II – PAPER I – ENVIRONMENTAL BIOLOGY – I

UNIT I

Atmosphere

Composition
Structure
Climatic factors
Interaction of ecological factors
Temperature and Plant distribution
Atmospheric pressure
Winds and air masses
Humidity and rain fall

UNIT II

Hydrosphere

Realms of water
Hydrological cycle
Physico-chemical aspects – rivers, estuaries, mangroves and seas
Freshwater (soft and hard)
Ecological groups of organisms and their adaptations
(Xerophytes and Xerocoles; Mesophytes and mesocoles; Hydrophytes and hydrocoles)

UNIT III

Lithosphere

Land forms
Soil formation
Components of soil
Physico-chemical properties of soil
Major soil types of India
Soil erosion (degradation)

UNIT IV

Natural resources

Types of resources – Mineral, Forest, Agriculture, Wild life and Fishery
Principles of conservation
Management of natural resources
Afforestation
Wild life management
Fresh water fish culture

UNIT V

Energy and Environment

Concept of energy
Types and sources of energy
Energy in the environment
Productivity in the environment
Measurement of Primary Production
Uses of Primary production to Man

II M.Sc., SEMESTER IV **OPTIONAL SUBJECT II – PAPER II** **ENVIRONMENTAL BIOLOGY II**

UNIT I

Air Pollution

Air pollutants
Chemistry of air pollutants
Sources
Effects on the environment – Acid rain, Green house effect
Effects on the living organisms including man
Control methods of air pollution

UNIT II

Water pollution

Water pollutants
Types of water pollutants
Sources
Effects on the environment
Effects on the living organisms including man
Riverine pollution
Marine pollution
Control methods of water pollution

UNIT III

Soil, Noise, Thermal and Radioactive Pollution

Solid waste pollution – their effects on the environment, organisms including man
Solid waste management
Sources of noise – their effects on the environment, organisms including man
Thermal and radioactive pollution – their effects on the environment, organisms including man

UNIT IV

Toxicology

Classification
Scope and significance
Toxicants and toxicity
Toxicological testing methods

UNIT V

Environment quality, awareness and management
 Ecoindicators and the environment
 Bioindicators and the environment
 Environmental Education and Awareness
 Environmental monitoring and impact assessment

Reference:

1. Odum E 1969 Fundamentals of Ecology
2. Prosser E L 1978 Environmental and Metabolic Animal Physiology

PRACTICAL - IV**OPTIONAL SUBJECT II – ENVIRONMENTAL BIOLOGY PRACTICAL****EXPERIMENTS****I. Analysis of water – Determination of:-**

Pond/Pool water, Canal/River water, Sewage water

1. pH
2. Total dissolved solids
3. Turbidity / light penetration
4. CO₂ and O₂
5. Hardness (Temporary and permanent)
6. Sulphates and sulphites
7. BOD and COD (Demonstration only)

II. Analysis of soil – Determination of:-

Clayey soil, Sandy soil, Garden soil / Red soil

1. Soil Moisture
2. Chlorides
3. Sulphates
4. Nitrates
5. Total Phosphates
6. Total organic matter
7. Humous
8. Chlorophylls and Phaeopigments

III. Biological analysis (Spotters)

1. Qualitative analysis of organisms (Pollution indicator) such as diatoms / algae, flagellates, ciliates, planarians, Annelids, Rotifers, Insects and their larvae.
2. Biological analysis of sewage water and industrial effluent

Field study

1. Detailed study of Pond / Pool ecosystems
 - a. Physico-chemical parameter
 - b. Qualitative and Quantitative analysis of plankton
2. Study of an industrial effluent

Field trips

1. Visit to – Drinking water treatment plant; Industrial effluent treatment plant; Pollution control lab.

Submission at the time of Practical Examination

1. Report on the Field study and Field trips
2. A minimum of 5 whole mounts of Planktons
3. Bonafide Record

II M.Sc., SEMESTER IV
OPTIONAL SUBJECT II – PAPER I - TOXICOLOGY I

UNIT I

Origin – Scope – importance of Toxicology Toxicity – Acute & Chronic Bioassays – Methods in Toxicology

UNIT II

Classification of Toxicants – Pesticides, heavy metals – Oil and combustion, chemicals Radio active substances

UNIT III

Route of exposure – Absorption – Distribution – excretion

UNIT IV

Mode of action of Xenobiotics Target site interactions – Factors affecting xenobiotic chemicals

UNIT V

Persistence of Toxicants

Toxic residues – Residue analysis (procedure & Techniques)

II. M.Sc., SEMESTER IV
OPTIONAL SUBJECT II – PAPER II - TOXICOLOGY II

UNIT I

Toxicants in the environment (in lithosphere, hydrosphere, atmosphere) – Dynamics of toxicants in the environment – Bioaccumulation, Bio transformation, Bio-degradation.

UNIT II

Physiological and biochemical effects of xenobiotics and flora and fauna – Impact of toxic chemicals on enzymes systems, factors affecting toxicity of xenobiotic chemicals

UNIT III

Teratogenesis and Teratogenicity evaluation, Mutagens and Mutagenicity evaluation, Carcinogen and carcinogenicity evaluation

UNIT IV

Environmental Toxic impact assessment – water, soil and biological analysis in Toxicological studies Assessment of water quality, standards and Human health

UNIT V

Safety evaluation of toxicants – Ausidoral procedures

PRACTICAL IV **OPTIONAL SUBJECT II – TOXICOLOGY PRACTICAL**

1. Determination of LC50 using Finney's Method (1978)
2. Probit Analysis – Theory
3. LD50 and EC50 – Theory
4. Effect of toxicants on tissues – Histopathology of Liver, Kidney and Muscle sections
5. Effect of toxicants on Haematological parameters – Haemoglobin content, WBC and RBC counts
6. Antagonistic and synergistic effects – Theory
7. Effect of temperature on toxicity – Theory
8. Effect of pH on toxicity – Theory

Submission of Slides

Submission of 20 slides showing histopathology of tissues

COMPULSORY DIPLOMA COURSE : POULTRY SCIENCE AND MANAGEMENT

I SEMESTER : POULTRY SCIENCE AND MANAGEMENT – PAPER I

UNIT : I

History and importance of Poultry farming.

Poultry Industry in India.

Economical contribution of Poultry industry:

- a. Employment Potential
- b. Rural Development
- c. National Productivity

Egg Production in India

Poultry manure and its application

UNIT : II

Breeds of Poultry Birds – Indian and Exotic birds and their characteristics.

Table birds and ducks in India – A general review.

Anatomy and physiology of poultry birds with reference to digestive and reproductive systems.

UNIT : III

Methods and breeding of hybrids and cross breeds
Selection of chicks and parental stocks in poultry.
Selection and incubation of eggs : Types of incubators and natural and artificial incubation.

UNIT : IV

Poultry houses : Location, types and construction.
Brooding Management : Types of brooders; Lighting, temperature and feeding management.
Poultry house equipments : Water and feeding equipments.

UNIT : V

Rearing of chicks : a. Deep litter system b. Cage system
Types, methods, advantages and disadvantages of both systems.

II SEMESTER
POULTRY SCIENCE AND MANAGEMENT – PAPER II

UNIT : I

Nutrition of poultry birds :
a. Carbohydrate sources.
b. Vegetable and animal protein sources
c. Mineral source. D. Essential inorganic elements.

UNIT : II

Feed formulations :
a. Byproducts and raw materials.
b. Methods of preparations – Grinding, mixing and milling, processing and equipments.
c. Grower mash, layer mash and broiler mash.
d. Non-nutritive food additives.

UNIT : III

Diseases of poultry birds : Types, symptoms and treatments.
a. Viral diseases
b. Bacterial diseases
c. Fungal diseases.
d. Protozoan and helminth parasites
Sanitation of poultry farms.

UNIT : IV

Vitamins and their importance on poultry birds.
Vitamins : A, B, (Different types), D, E and K – their sources and functions.
Vitamin deficiencies , symptoms in poultry birds and remedies.

UNIT : V

Vaccines : Marek's disease vaccine, Ranikhet Disease vaccine, pigeon pox vaccine (PPV), Fowl pox vaccine (FPV).
Vaccination schedule in poultry farms.
Animal health products : Types and dosages.

III SEMESTER
POULTRY SCIENCE AND MANAGEMENT – PAPER III

UNIT : I

Management of growers:

Spacing requirements; Watering and feeding programmes:
Disease control; Debeaking and cannibalism.

UNIT : II

Management of layers:

Spacing : watering and feeding programmes; egg collection; good and poor layers ; culling and profitability.

UNIT : III

Management of broilers:

Stocking; feeding strategies ; relation between feed consumption and growth; disease control; marketing of broilers.

UNIT : IV

Importance of lighting and day length in poultry farms.
Summer and winter management of poultry birds.
Stress management of poultry birds: consequences and precautions.

UNIT : V

Grading and preservation of eggs.
Packing, transportation and marketing of eggs.
Egg production and maintenance of price of eggs.
Nutritive value and uses of eggs in bakery production and other edible items.

IV SEMESTER
POULTRY SCIENCE AND MANAGEMENT - PRACTICAL

1. Identification of different breeds of poultry birds.
2. Preparation of poultry feeds using different materials.
3. Incubation of eggs to study the developmental stages of chick.
4. Screening and isolation of diseased birds based on the observed symptoms and abnormalities.
5. Study of the symptoms of the deficiencies of vitamins in poultry birds.
6. Grading of the eggs on the basis of weight and size.
7. Study of the characteristics of normal and abnormal eggs.
 - A. Structure of the normal egg.
 - B. Structure of the Double yolked egg.
 - C. Structure of the Leathery egg.
 - D. Egg shell with cleanliness.

- E. Egg with broken shell.
F. Small / pullet egg.
8. Study of the feathers of poultry birds.
A. Quill or contour feather.
B. Down or plumule feather
C. Filoplumes
D. Coverts
9. Poultry hygiene, sanitation and vaccinations.
10. **Spotters:**
- A. Poultry house equipments.**
1. Waterers (Water equipments)
2. Feeders (Feeding equipments)
3. Cages
4. Brooders and Light arrangements
5. Sprayer
6. Egg tray
7. Debeaking equipment
- B. Nutrients and raw materials as food sources**
1. Groewer mash 2. Layer mash 3. Broiler mash
- C. Control of Poultry diseases**
1. Vaccines 2. Antibiotics 3. Commercial food additives
- D. Uses of chemical and other materials:**
1. Formalin 2. Potassium permanaganate
3. Sodium silicate 4. Calcium carbonate (Lime)
5. Lime stone 6. Oil – coconut oil
7. Faecal matter of poultry birds.
8.
11. Visit to a poultry farm, egg selling shops and broiler centres to study the processes and problems.

NB : Practical Record (Based on 1 to 10) and a report (Based on 11), indicated as above, to be submitted at the time of Practical Examination.

M.Sc., (Zoology)

COMPULSORY DIPLOMA COURSE : DIPLOMA IN COMMUNITY HEALTH

SEMESTER - I

DIPLOMA PAPER 1 - ENVIRONMENT AND HEALTH

UNIT I

Water pollutants – Purification – Mechanical and Chemical methods.

UNIT II

Air pollutants – Control of air pollution – Disinfection of air – Ventilation, UV radiation.

UNIT III

Noise pollution – Control measures, Radiations – Causes and Control

UNIT IV

Medical entomology: Vector control – Flies, flees and Rodent Control

UNIT V

Environmental sanitation – Waste disposal – Sewage, Sullage and Hospital waste disposal

REFERENCES

1. Park's Text book of Preventive and social medicine by Dr. Jahan Evertt Rark
2. Environmental Biology by S. K. Dubey
3. Environment Pollutants and Women's Health by Mahendra Pandey
4. Waste water Treatment by Sheela Sanghvi
5. Environment and Pollution by N. Arumugam and V. Kumerasan
6. Ecology and Ethology by V. K. Agarwal & Usha Gupta

SEMESTER - II

DIPLOMA PAPER II - COMMUNICABLE AND NON-COMMUNICABLE DISEASES

UNIT I

Respiratory infections – Influenza, Mumps, Measles, Rubella, Acute respiratory infections and TB.

UNIT II

Intestinal infections – Polio, Cholera, Acute diarrhea diseases, Food poisoning, Typhoid, Amoebiasis Ascariasis, Hook worm, Tapeworm, Pinworm infections.

UNIT III

Vector borne Infections – Leprosy, STD – AIDS – Diagnostic Techniques and Treatment.

UNIT IV

Surface Infections – Leprosy STD – AIDS – Diagnostic Techniques and Treatment.

UNIT V

Non-communicable diseases – Hyper Tension – Diabetes – Coronary Heart diseases – Cancer, Obesity, Blindness, Accidents – Preventive measures.

REFERENCES

1. Park's Text Book of preventive and social medicine
2. Medical Microbiology by K.C.Sawant
3. Virology by K.C.Sawant
4. Bacteriology by Subrata Bhattacharjee
5. Text book Microbiology by Ananthanarayan
6. Medical Microbiology by Panicker
7. A Text book of Microbiology by R.c.Dubey and D.K.Maheswari

SEMESTER - III
DIPLOMA PAPER III - HEALTH CARE OF THE COMMUNITY

UNIT I

Nutrition and health - Balanced Diet, food surveillance, food fortifications- addition of vitamins and minerals - Adulteration and preventive steps

UNIT II

Physical health-care of skin, hair, teeth, eyes, ears, hands and feet-physical exercises and their importance - Walking and jogging - Yoga and meditation - stress Relief.

UNIT III

Health Programmes and health education - Malaria control - TB control - AIDS control programmes Immunization programmes -

UNIT IV

Social sciences and mental health - Sociology; Social structure, culture and customs - social problems-Mental health - cases of mental illness Alcoholism and drug dependence - prevention Rehabilitation.

UNIT V

Family planning, Maternal and child health - Antenatal and Postnatal care - Reproductive and child Health programme. (RCH).

REFERENCES

1. Park's Text books of preventive and social medicine
2. Immune - biotechnology by Naha & Narain
3. Immunology by Dulsy Fatima & N.Arumugam
4. Food and Nutrition by L.Swaminathan
5. Die tics by Srilakshmi
6. Practice of fertility control & Comprehensive manual 6th edition by S.K.Choudhary

SEMESTER - IV
DIPLOMA IN COMMUNITY HEALTH - PRACTICAL

1. Water Analysis : Physicochemical parameters
2. Bacteriology : Hanging drop method, Gram's staining, pasteurization of milk.
3. Diagnostic test : Diabetic test, Hypertension test, Widal test, VDRL test
4. Sterilization techniques: Autoclave, Hot Air oven
5. Food Adulteration Any four Food Stuffs
6. Family Planning and Aids Awareness
Any four intra-uterine devises, ELISA test, RIA test (Demonstration only)
7. Infectious Agents
Entamoeba, Ascaris, Hook worm, Pinworm, Tape worm, Malarial parasite and Filarial parasite.

M.Sc., Zoology – Theory
(General Model Question Paper)

Time: 3 Hrs**Max. Marks: 75****Section A**

Objective type questions with no choice (10 questions – 2 each from every unit)

10 x 1 = 10

Section B

Short answer questions of either / or type (5 questions – 1 each from every unit)

5 x 5 = 25

Section C

Essay type questions of either or type (5 question – 1 each from every unit)

5 x 8 = 40

75

The answers not to exceed 1200 words

M.Sc Zoology
(General Model Practical Question Paper)

Time: 4 Hrs**Max. Marks: 75*****PATTERN A****Section A**

Major Practical (Procedure, Tabulation; Calculation; Result; Discussion)

25

Section B

Minor Practical (i)

10

(ii)

10

Section C

Spotters (A) Question I

4 x 5 = 20

(B) Question II

(C) Question III

(D) Question IV

Section D

Record

10

75***PATTERN B****Section A**

Major Practical (Procedure, Tabulation; Calculation; Result; Discussion)

25

Section B

Minor Practical (i)

10

Section C

Spotters (A) Question I

3 x 5 = 15

(B) Question II

(C) Question III

Section D

Submission of slides / insect box

15

Section E

Record

10

75

*Relevant pattern may be applied according to the nature of the practicals

PG DIPLOMA PRACTICALS

Time: 4 Hrs

Max. Marks: 75

Section A

Major Practical

30

Section B

Minor Practical (i)

15

Section C

Spotters (A) Question I

4 x 5 = 20

(B) Question II

(C) Question III

(D) Question IV

Section D

Record

10

75