

Credit : 5
Hours/Week :5Code: RR1Z1
Medium of instruction: Tamil & English
SEMESTER - I (For students admitted from 2015 onwards)

CC1 - INVERTEBRATA

Unit - I

General characters and classification

PHYLUM PROTOZOA: Characters and classification up to class level with examples

DETAILED STUDY: Paramecium and *Entamoeba histolytica*

GENERAL TOPICS: Adaptation of Protozoan parasites, Life cycle of Plasmodium

Unit –II

PHYLUM PORIFERA : Characters and classification upto class level with examples

DETAILED STUDY : Ascon sponge

GENERAL TOPICS : Canal system in sponges, spicules of sponges

PHYLUM COELENTERATA: Characters and classification upto class level with examples

DETAILED STUDY : *Obelia* colony

GENERAL TOPICS : Corals and coral reefs

Unit –III

PHYLUM PLATYHELMINTHES: Characters and classification upto class level with examples

DETAILED STUDY : *Taenia solium*

GENERAL TOPICS : Parasitic adaptations in Platyhelminthes

PHYLUM NEMATODA: Characters and classification upto class level with examples

DETAILED STUDY : *Ascaris lumbricoides*

GENERAL TOPICS : Parasitic adaptations in nematodes

Unit –IV

PHYLUM ANNELIDA: Characters and classification upto class level with examples

DETAILED STUDY : Earthworm

GENERAL TOPICS : Modes of life in Annelida

PHYLUM ARTHROPODA: Characters and classification upto class level with examples

DETAILED STUDY : *Peneus monodon*

GENERAL TOPICS : Crustacean larvae and their significances

Unit – V

PHYLUM MOLLUSCA: Characters and classification upto class level with examples

DETAILED STUDY : Freshwater mussel

GENERAL TOPICS : Cephalopod as an advanced mollusc.

PHYLUM ECHINODERMATA: Characters and classification upto class level with examples

DETAILED STUDY : *Asterias*

GENERAL TOPICS : Echinoderm larvae and their significances, water vascular system

REFERENCE BOOKS

- 1. EKAMBARANATHA AYYAR, M and ANANTHAKRISHNAN, T.N.** 2000. Manual of Zoology, Volume I – Invertebrate Zoology, Kitab Mahal, Allahabad.), S. Viswanathan Pvt. Ltd.
- 2. NIGAM, N.C.** 1998. Invertebrate Zoology, S. Nigam & Co. New Delhi.
- 3. JORDAN, E.L. & VERMA, P.S.** 2005. Invertebrate Zoology, S. Chand & Co. New Delhi.
- 4. PURANIL, P.G. & THAKUR, R.S.** 2000. Invertebrates Zoology, S. Chand & Co. New Delhi
- 5. PRASAD, S.N.** 1997. A text book of Invertebrates

Question pattern

(Marks :75)

Time:3Hours

Part A: 10×2=20 Marks Answer All Questions (Two Questions from each Unit)

Part B: 5×5=25 Marks Answer All Questions (Either or type – Two questions from each Unit)

Part C: 3×10=30 Marks Answer any Three Questions (One Question from each Unit)

Credit :5

Hours/Week :3Code: RR1ZP1

Medium of instruction: Tamil & English

SEMESTER - I (For students admitted from 2015 onwards)

CC2- INVERTEBRATA– Major Practical – I

EARTHWORM: Nervous system, mounting of penial and body setae.

PRAWN: Mounting of appendages.

COCKROACH: Digestive and nervous systems.

Mounting of mouth parts of Honey bee, Mosquito and cockroach.

PILA : Digestive system

Mounting of radula

SPOTTERS

PROTOZOA:*Entamoeba, Euglena, Paramecium* (entire, binary fission and conjugation)

PORIFERA :*Sycon, Spicules* and *Gemmules*.

COELENTERATA: *Obelia* (entire, medusa), *Aurelia, Sea anemone*.

CORALS:Madrepora, Tubipora, Fungia, Favia.

PLATYHELMINTHES:*Planaria*(W.M. & T.S), *Fasciola* (W.M. & T.S), Redia, Cercaria, Tapeworm (W.M. & T.S, Scolex)

NEMATODA: *Ascaris*(Entire – Male and Female), T.S. (Male and Female).

ANNELIDA:Neries (Entire, T.S, Parapodium, Heteronereis), Leech (Entire & T.S)

ARTHROPODA: *Streptocephalus, Daphnia, Cyclops, Lepas, Balanus, Sacculina, Hippa, Limulus, Scolopendra, Prawn*.

LARVAE:Nauplius, Zoea, Mysis

BENEFICIAL INSECTS: Honey bee and Silkworm

MOLLUSCA:Pila, Chiton, Murex, Sepia, Octopus, Nautilus, Xancus, Aplysia, Mytilus, Loligo, Cuttlebone.

ECHINODERMATA: Star fish, Sea urchin, Sea cucumber, Sea lilly, Pedicellaria, Bipinnaria larva, Ophiopluteus larva

Credit : 5

Hours/Week :6 Code: RR2Z2

Medium of instruction: Tamil & English

SEMESTER - II (For students admitted from 2015 onwards)

CC3 - CHORDATA

Unit – I

General characters and classification of Prochordates

PROCHORDATES: Detailed study of Amphioxus, Retrogressive metamorphosis in Ascidia,
Biological significances of Balanoglossus

CYCLOSTOMATA: Distinctive features of cyclostomes and their affinities.

DETAIL STUDY : *Petromyzon*

Unit – II

Comparative study of the following systems in vertebrates: Fish, Frog, Calotes, Pigeon and Rabbit.
Integument, Digestive, Respiratory, Circulatory system

Unit – III

Comparative study of the following animal: Fish, Frog, Calotes, Pigeon and Rabbit.
Excretory, Nervous and Reproductive system

Unit – IV

Migration of fishes – Accessory respiratory organ in fishes

Parental care in Amphibia

Poison apparatus and Identification of south Indian Poisonous and nonpoisonous snakes

Unit – V

Aves: Flight adaptation of birds, Distribution of flightless birds, Migration of birds

Mammals: Egg laying mammals, Aquatic mammals, Dentition in mammals

REFERENCE BOOKS

1. EKAMBARANATHA AYYAR. M and ANANTHAKRISHNAN, T.N. 2000. Manual of Zoology, (Volume II – Chordate Zoology.) S. Viswanathan Pvt. Ltd.

2. NIGAM, N.C. 1996. Zoology of Chordate, S. Nagin & Co. New Delhi.

3. JORDAN, E.L. 2007. Chordate Zoology, S. Chand & Co. New Delhi.

4. MAJUPURIA, T.C. 2002. Introduction of chordates. S. Nagin & Co. New Delhi

5. YOUNG, T.Z. 1981, The life of Vertebrates. Oxford University Press

Question pattern

(Marks :75)

Time:3Hours

Part A : $10 \times 2 = 20$ Marks Answer All Questions (Two Questions from each Unit)

Part B: $5 \times 5 = 25$ Marks Answer All Questions (Either or type – Two questions from each Unit)

Part C : $3 \times 10 = 30$ Marks Answer any Three Questions (One Question from each Unit)

Credit : 5

Hours/Week :3Code: RR2ZP2

Medium of instruction: Tamil & English

SEMESTER - II (For students admitted from 2015 onwards)

CC4 –CHORDATA -Major Practical – II

DISSECTIONS

SHARK: Mounting of placoid scales

RAT/ FISH/CALOTES: Mounting of brain, arterial system and urinogenital system

SPOTTERS: Prochordata: Balanoglossus, Amphioxus and Ascidian

Pisces: Scolidon, Arius, Gambusia, Hippocampus, Exocoetus, Anabas, Synaptura.

Amphibia: Bufo, Hyla, Salamander

Reptilia: Hemidactylus, Draco, Varanus, Naja, Viper, Chelone

Aves: King fisher, Pigeon, Owl, Quill feather, Symsacrum

Mammalia: Rabbit, Rat, Loris and Bat

Skeletal system: Frog, skull, Pectoral and Pelvic girdle, forelimb and hindlimb.

Dentition: Rabbit, Man, Dog.

Credit : 5
Hours/Week : 6 Code: RR3Z3
Medium of instruction: Tamil & English
SEMESTER - III (For students admitted from 2015 onwards)

CC5- CELL AND MOLECULAR BIOLOGY

Unit - 1

Microscopy: Compound and Electron microscopes
Cell: Introduction –Ultrastructure-Comparison between Prokaryotic and Eukaryotic cells; Plasma membrane –Ultrastructure,modification of plasma membrane and its function.

Unit-II

Ultrastructure and functions of cytoplasmic organelles:endoplasmic reticulum, golgi complex, lysosome mitochondria,ribosome, centrosome.

Unit-III

Ultrastructure of nucleus, chromatin reticulum, nucleolus and chromosomes: Chromosome structure, Giant chromosomes:polytene and lamp brush chromosomes.
Cell cycle: Mitotic and meiotic cell divisions.

Unit-IV

Nucleic acids: DNA- Watson-Crick model, A, B and Z forms of DNA, DNA Replication.
RNA - Types, distinction between RNA and DNA
Central Dogma: Synthesis of DNA, RNA and protein
Genetic code

Unit-V

Cell Growth and Aging: Growth of cells in unicellular and multi cellular organisms-Aging and its causes - apoptosis
Cancer: Introduction - types (Carcinomas, Sarcomas, Lymphomas, Leukemia) -causes and carcinogenesis - Mutation and Viral theories of carcinogenesis

REFERENCE BOOKS

- 1. LEWIS, KELEINSMITH and VALERIS M.KISH, 1988**, Principles of cell biology, Harper and Row Publication, New York.
- 2. POWER, C.B 1983**, Cell Biology, Himalaya Publication House, Bombay.
- 3. WATSON, 1987**, Molecular Biology of the gene, The Benjamin Cumming Publishing Co. Inc., California.

Question pattern

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Time:3Hours

Part A : $10 \times 2 = 20$ Marks Answer All Questions (Two Questions from each Unit)

Part B: $5 \times 5 = 25$ Marks Answer All Questions (Either or type–Two questions from each Unit)

Part C : $3 \times 10 = 30$ Marks Answer ant Three Questions (One Question from each Unit)

Credit :5

Hours/Week : 3

Code: RR3ZP3

Medium of instruction: Tamil & English

SEMESTER - III (For students admitted from 2015 onwards)

CC6 - CELL AND MOLECULAR BIOLOGY -MAJOR PRACTICAL – III

- 1.Measurement of the cell by Micrometer
2. Study of prokaryotic cells using gram staining technique.
3. Study of eukaryotic cell using suitable staining technique (buccal epithelial Cells)
4. Methods of Protozoan culture (any two types) - demonstration
5. Mounting of Polytene chromosome in Chironomous Larva
6. Study of mitosis in onion root tip.
7. Study of meiosis in cockroach/grasshopper
8. Smear preparation of human blood/ goat
9. Smear preparation of cockroach haemolymph
10. Buccal smear preparation for localization of Mitochondria by using Janus Green stain
11. Vaginal smear preparations in femalerat

12Spotters:

1. Compound and dissection microscope, micrometer, camera lucida, centrifuge and pH meter
2. Simple epithelial cell: simple squamous epithelial, simple cuboidal epithelial, simple columnar epithelial
- 3 Stratified epithelial cells: stratified squamous, stratified cuboidal, stratified columnar and stratified transitional
- 4 Pseudostratified epithelial cells: pseudo stratified columnar, pseudostratified ciliated

Credit :5

Hours/Week :6

Code: RR4Z4

Medium of instruction: Tamil & English

SEMESTER - IV (For students admitted from 2015 onwards)

CC7- ENVIRONMENTAL BIOLOGY AND EVOLUTION

Unit-I

Abiotic factors – Water, Soil, Temperature and Light. Biotic factors–Animal relationship - Biogeochemical cycle, Ecosystem –Definition – Structure – pond ecosystem – primary production –secondary production – food chain web – trophic levels – Energy flow – Pyramid of biomass – Pyramid of energy.

Unit-II

Community ecology – Types of communities – Characteristics of community stratification – community interdependence- ecotone - edge effect – ecological niche – ecological succession. Population ecology – Definition – density – estimation – natality – mortality-age- distribution and age pyramid-life table-population growth – population equilibrium-biotic potential-regulation

Unit-III

Habitat ecology - Characteristics of Freshwater habitat- Marine water habitat- Estuary habitat- Terrestrial habitat. Special habitat adaptation of Intertidal animals, Intertidal rocky shore, Intertidal Muddy shore. Coral reef ecosystem.

Unit-IV

Introduction to evolution- Origin of life - evidences of evolution-morphological, physiological, embryological and palaeontological evidences-theories of evolution: Lamarkism, Darwinism, Modern theory of evolution

Unit-V

Species concept-speciation-factors influencing speciation-isolating mechanisms. Mimicry and colouration
Evolution of horse and Man-fossil evidences-future evolution of man. Animal Extinction-reasons and effects

REFERENCE BOOK

- 1.CHAPMAN, J.L. and M.J. REISS. 1997.** Ecology-Principles and Applications. Cambridge University Press, UK.
- 2. GHOSH, G.K. 1992.**Environmental Pollution.Ashish Publishing House, New Delhi.
- 3. ODUM, E.P. 1996.** Fundamentals of Ecology.Indian Edition.Nataraj Publishers, new Delhi.
- 4. BARTON, N.H., D.E.G.BRIGGS, J.A.EISEN, D.B.GOLDSTEIN and N.H. PATEL. 2007.** Evolution. Amazon Books.

Question pattern

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Part A : $10 \times 2 = 20$ Marks Answer All Questions (Two Questions from each Unit)

Part B: $5 \times 5 = 25$ Marks Answer All Questions (Either or type–Two questions from each Unit)

Part C : $3 \times 10 = 30$ Marks Answer ant Three Questions (One Question from each Unit)

Credit : 5

Hours/Week :3

Code: RR4ZP4

Medium of instruction: English

SEMESTER - IV (For students admitted from 2015 onwards)

CC8-ENVIRONMENTAL BIOLOGY AND EVOLUTION - PRACTICAL IV

ENVIRONMENTAL BIOLOGY

1. Analysis of structure of community in an ecosystem
2. Estimation of dissolved oxygen
3. Estimation of salinity
4. Determination of pH in water sample
5. Estimation of alkalinity of water
6. Estimation of carbon dioxide
7. Estimation of carbonate and bicarbonate
8. Identification of fresh and marine water planktons

SPOTTERS

Rocky, sandy, muddy shore fauna, Animal association examples

Ecological instruments: Secchi disc, pH meter,

EVOLUTION

Homologous and analogous organs

Mimicry and colorations: butterfly, stick insect, leaf insect, lycodon, lophius, Urey Miller

Experiment Model

Study of fossils: Ammonite, Trilobite, Lingual, Limulus

Modification of feet and beaks in birds

Visit to ecologically important places

Credit : 4

Hours/Week: 7 Code: RR5Z5

Medium of instruction: Tamil & English

SEMESTER - V (For students admitted from 2015 onwards)

CC9: ANIMAL PHYSIOLOGY AND BIOCHEMISTRY

Unit- I

Nutrition – Digestion, absorption and assimilation in man; Respiration - Mechanism of O₂ and CO₂ transport in man, respiratory pigments in animals; Circulation - composition and functions of blood - Structure and functions of Heart- Origin and conduction of heart beat and cardiac cycle.

Unit- II

Excretion - Nitrogenous wastes - Ammonotelism, Ureotelism, Uricotelism - Ornithine cycle - Mammalian Kidney - Urine formation, Osmo-ionic regulation in fresh water and marine fishes, Muscle - Types of muscles, ultra structure and physiology of contraction of skeletal muscles.

Unit- III

Nerve – Neuron, types of conduction, nerve impulse, synapsis, Synaptic cleft, synaptic transmission, reflex action, Neuro transmitters; Receptors - phono and photo receptors in Man; Hormonal regulation of metabolism and Reproductive cycle - estrous cycle - Menstrual cycle.

Unit- IV

Structure, functions and classifications of carbohydrates, proteins and lipids with examples. Vitamins - water and fat soluble vitamins - occurrence, functions and deficiency diseases.

Unit - V

Metabolism - Carbohydrate, Protein and Lipid. Enzymes - types, properties, mode of action and theories on enzyme action.

REFERENCE BOOKS

1. **Agarwal, R.A, A.K. Srivastava and Kaushalkumar.** Animal physiology, 2nd Edition, S. Chand & Co., New Delhi, 1978.
2. **HOAR W.S.** (1987). General and Comparative Physiology, Prentice Hall.
3. **TURNER, C.D.** and Bagnara, J.T. (1976). General Endocrinology, 6thEdn., WB Saunders Co., Philadelphia.
4. **SCHMIDT NEILSSEN, K.**(1985). Animal Physiology, Adaptation and Environment, CUP, London.
5. **ECHERT, R. and RANDALL, D.** (1987). Animal Physiology, CBS Publishers and Distributors.
6. **LEHNINGER L. ALBERT, DAVID. L. NELSON and MICHAEL M. Cox.** (1993), Principles of Biochemistry, CBS Publishers and Distributors, New Delhi.
7. **STRYER, L.** (1988). Biochemistry, W.H. Freeman and Company, New York.
8. **COOPER, T.G.** (1977). The Tools of Biochemistry, Wiley Inter science Publication, John Wiley and Sons, New York.

Question pattern

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Time:3Hours

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Part B: 5×5=25 Marks Answer All Questions (Either or type–Two questions from each Unit)

Part C : 3 ×10 =30 Marks Answer ant Three Questions (One Question from each Unit)

Credit : 4
Hours/Week : 3 Code: RR5ZP5
Medium of instruction: Tamil & English
SEMESTER - V (For students admitted from 2015 onwards)

**CC-10 ANIMALPHYSIOLOGY, BIOCHEMISTRY, GENETICS,
MICROBIOLOGY& IMMUNOLOGY - PRACTICAL V**

ANIMAL PHYSIOLOGY

Estimation of Haemoglobin.
Enumeration of RBC by haemocytometer.
Enumeration of WBC by haemocytometer.
Qualitative test for Ammonia, Urea and Uric acid.
Human salivary amylase activity in relation to pH.

SPOTTERS

Haemoglobinometer, Haemocytometer, Stethoscope, Sphygmomanometer, ECG, Pacemaker, pH meter, Ti plasmid, pBR322 vector, Petri plate, Autoclave, Inoculation loop and laminar flow.

BIOCHEMISTRY

pH measurement.
Qualitative tests for protein, carbohydrate and lipid.
Beer Lambert law verification.

GENETICS

Drosophila - male, female identification. Mutant varieties of Drosophila, Mendelian traits in man, Pedigree analysis, polygenic inheritance - finger print patterns

MICROBIOLOGY AND IMMUNOLOGY

Culture techniques - broth, slants and spread plate methods.
Motility determination by hanging drop method.
Preparation of smear, simple staining and Gram's staining.
ABO Blood grouping.

Credit : 4

Hours/Week : 7

Code:RR5ZEL1

Medium of instruction: Tamil & English

SEMESTER - V (For students admitted from 2015 onwards)

MEC1 – GENETICS

Unit-I

Classical Genetics: Introduction, Mendel's laws of inheritance, Mono and dihybrid crosses, test cross, complete and incomplete dominance, co-dominance. Interaction of genes- Epistasis, complementary genes, duplicates genes, supplementary genes, lethal genes - multiple alleles.

Unit-II

Chromosome: Linkage – coupling and repulsion, Crossing over – example, mechanism, frequency; Chromosome map ; Numerical changes of chromosomes - euploidy, aneuploidy; Structural changes of chromosomes - deletion, duplication, translocation, inversion.

Unit-III

Nature of Genetic Material:evidence that DNA is the genetic material; Fine structure of gene; Gene regulation in prokaryotes-*Lac* Operon; Gene regulation in eukaryotes-Britten and Davidson's model; Gene mutations - insertion, deletion, transition (tautomerization, base analogs, deamination), transversion; spontaneous and induced mutations, mutagens.

Unit-IV

Microbial Genetics:Bacterial genetics-transformation, conjugation; plasmids; movable genes Genetics of viruses-lytic and lysogenic cycles of phage, recombination in phage, transduction.

Unit-V

Human Genetics: Human chromosome and Sex determination, Mendelian phenotypic traits of man, Syndromes and metabolic disorders, polygenic inheritance, eugenics and eugenics, pedigree studies, introduction to human genome project.

REFERENCE BOOK

- 1.VERMA P.S. and V.K AGARWAL.2004. 'Genetics'. S.Chand and Co., New Delhi
- 2.DANIEL, L. HARTL(1994).Genetics (III Edn) Jones and Bartlet publishers. Boston.
- 3.ELOF AXEL CARLSON(1985). Genetics, Tata McGraw Hill Publishing Co.
- 4.JENKINS, J.B. (1975).Genetics, Houghton Mifflin Co., Boston.
- 5.ROBERT, H. TAMARIN(1996).Principles of Genetics, WCB publishers.
- 6.RUTHWELL, M.W.(1978). Human Genetics, Prentices Hall of India Pvt., Ltd.,
- 7.STRICK BERGERMONOR, W. (1996).Genetics, Prentices Hall of India Pvt., Ltd.,

Question pattern

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Part B: $5 \times 5 = 25$ Marks Answer All Questions (Either or type–Two questions from each Unit)

Part C : $3 \times 10 = 30$ Marks Answer ant Three Questions (One Question from each Unit)

Credit : 4

Hours/Week :7 Code: RR5ZEL2

Medium of instruction: Tamil & English

SEMESTER - V (For students admitted from 2015 onwards)

MEC2 - MICROBIOLOGY AND IMMUNOLOGY

Unit- I

Historical development of microbiology. Organization of a) Bacterial cell b) Fungal cell, c) Yeast, d) Bacteriophage and e) Virus. Nutritional classification of bacteria. Gram's staining. Bacterial culture - sampling, inoculation, culture media preparation, decimal dilution procedure, maintenance of pure culture, bacterial growth curve, bacterial growth measurement.

Unit- II

Applied microbiology – food poisoning, spoilage and food preservation, biogeochemical activity of microbes in nitrogen cycle and sulphur cycle, microbial biopesticides, microbes in fuel production, microbial production of antibiotics and vaccines

Unit-III

Development of Immunology. Innate immunity – physical, biochemical, cellular and genetic factors. Acquired immunity - active and passive immunity. Primary lymphoid organs - thymus, Bursa of Fabricius, bone marrow; Secondary lymphoid organs - spleen, lymph nodes and MALT.

Unit-IV

Cells of the immune system: Stem cells; Cells of lymphoid lineage - lymphocytes, null cells; Cells of myeloid lineage - monocytes, macrophages, polymorphonuclear leucocytes, mast cells, antigen presenting cells, platelets.

Unit-V

Antigens - antigens, haptens, epitopes, paratopes. Antibodies (immunoglobulins) - basic structure, biological properties, humoral immunity. Cell mediated immunity - Cells involved in CMI, cytokines and lymphokines. Complements. MHC molecules.

REFERENCE BOOKS

1. ANANTHANARAYANAN, R AND JAYARAM PANIKER, C.K. (2000), Text book of Microbiology, VI Ed., Orient Longman Ltd., Madras.

2. COLEMAN, LOMBARD AND SICARD (1992). Fundamental Immunology, W.M.C. Brown Publishers.

3. KUBY, J. (1994). Immunology. W.H. Freeman and Co., New York.

4. PELCZER, M.J., REID, R.D AND CHAN, E.C.S. (1996), Microbiology, V. Ed., Tata McGraw Hill Publishing Company Ltd., New Delhi.

Question pattern

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Time:3Hours

Part A : $10 \times 2 = 20$ Marks Answer All Questions (Two Questions from each Unit)

Part B: $5 \times 5 = 25$ Marks Answer All Questions (Either or type—Two questions from each Unit)

Part C : $3 \times 10 = 30$ Marks Answer ant Three Questions (One Question from each Unit)

Credit :4

Hours/Week : 7 Code: RR6Z6

Medium of instruction: Tamil & English

SEMESTER - VI (For students admitted from 2015 onwards)

CC11- DEVELOPMENTAL BIOLOGY

Unit – I

History of developmental biology – Theory of pre-formation, Theory of epigenesis, Van Baer's law, Biogenetic law. Sperms and Ova structure and type. Gametogenesis– spermatogenesis, oogenesis.

Unit – II

Fertilization – acrosomal reaction, cortical changes, theories of fertilization, physiological changes. Cleavage-planes and patterns. Frog- blastulation and gastrulation, fate map.

Unit -III

Organogenesis – development of eye, heart and brain. Foetal membranes in chick. Placentations in mammals – classification, functions. Gradient theory – types, experimental evidences.

Unit –IV

Organizer – properties, structure, induction. Metamorphosis – amphibian metamorphosis, hormonal control of amphibian metamorphosis. Regeneration – types, regeneration events in Planaria, events.

Unit –V

Nuclear transplantation experiments in sea urchin. IVF and Embryo transfer. *In vitro* culture of embryos, GIFT, ZIFT, Test tube baby- Birth control measures

REFERENCE BOOKS

- 1. VERMA P.S. and V.K AGARWAL.**2004. 'Genetics'. S.Chand and Co., New Delhi
- 2.BERRIL. N.J (1986)**, Developmental biology.Tata McGraw Hill, New Delhi.
- 3.BROWDER, L.N. (1980)**, Developmental Biology, Saunders College, Philadelphia.
- 4.DEUCHAR, E.M (1976)**, Cellular interaction in Animal Development. Chapman and Hall, London.
- 5.GILBERT, S.F. (1995)**, Development Biology, II Edn., Sinauer Associate Unc., Publishers, Saunderland, Massachusetts, USA. Macmillan Publishing Co., New York.
- 6.MICHAEL T. MADIGAN, JOHN M, MARTINKIL, JACK PARKER(1997)**. Biology of Microorganisms, VIII Ed., Prentice Hall International Inc., USA.
- 7.WILLAR, B.H. and OPPENHEIMER, J.M. (1964)**. Fundamentals of Experimental Embryology, Prentice Hall

Question pattern

(Marks :75)

Time:3Hours

Part A : $10 \times 2 = 20$ Marks Answer All Questions (Two Questions from each Unit)

Part B: $5 \times 5 = 25$ Marks Answer All Questions (Either or type–Two questions from each Unit)

Part C : $3 \times 10 = 30$ Marks Answer ant Three Questions (One Question from each Unit)

Credit : 4

Hours/Week:7 Code: RR6Z7

Medium of instruction: Tamil & English

SEMESTER - VI (For students admitted from 2015 onwards)

CC12 - BIOSTATISTICS AND COMPUTER APPLICATIONS

Unit-I

Data-Types of data-primary and secondary data-method of data collection-classification and tabulation of data-Diagrammatic- Histogram, Frequency Polygon, Pie, Curve, Ogive and graphical representation of data

Unit- II

Measures of central tendency-mean-median-mode with simple problems. Measures of dispersion - range- standard deviation- variance- standard error-Correlation, Spearman rank correlation and regression-types

Unit- III

Hypothesis test – paired T test, Student t test (testing correlation coefficient and testing two independent samples), Chi square test- Correlation, Rank correlation.

Unit-IV

Introduction to computer-generation-types (Based on size and Functional)- Hardware-Basic components of Computer-Input and Out devices with examples, CPU and Memory Unit)

Unit-V

Brief Introduction of Software (Operational and Application software). Application Software-WORD, EXCEL and POWER POINT- Internet, Web site, Browser(Mozilla and Explorer)-Email-Computer applications in Biology. Computer viruses – Introduction

REFERENCE BOOKS

- 1.GURUMANI, N.** 2005. An introduction to biostatistics.MJP Publishers. Chennai
- 2.RAMAKRISHNAN, P.** 2010. Biostatistics.Saras Publications, Nagercoil.
- 3.SOKAL, R. AND ROHALF, F.J.** 2009. Introduction to biostatistics. Dower Publications Inc., New York.
- 4.PILLAI AND BHAGAWATHI.** Statistics

Question pattern

(Marks :75)

Time:3Hours

Part A : $10 \times 2 = 20$ Marks Answer All Questions (Two Questions from each Unit)

Part B: $5 \times 5 = 25$ Marks Answer All Questions (Either or type–Two questions from each Unit)

Part C : $3 \times 10 = 30$ Marks Answer ant Three Questions (One Question from each Unit)

Credit : 4
Hours/Week : 3 Code: RR6ZP6
Medium of instruction: Tamil & English
SEMESTER - VI (For students admitted from 2015 onwards)

CC13 - DEVELOPMENTAL BIOLOGY, BIostatISTICS, COMPUTER APPLICATIONS AND BIOTECHNOLOGY- PRACTICAL –VI

DEVELOPMENTAL BIOLOGY

Temporary mounting of chick blastoderm.
Observation of mammalian spermatozoa (bull/Goat)
Examination of prepared microslides: Frog-egg, cleavage (2, 4, 8 cell stage).
Blastula, Gastrula, Yolk plug, tadpole
Chick embryo developmental stages-24, 48 and 72 hours

BIostatISTICS

Calculation of mean, median, mode
Standard deviation, standard error, correlation and regression by using biological samples.

COMPUTER APPLICATIONS

Spotters: input and output devices

BIOTECHNOLOGY

Isolation of DNA (human buccal cells)
PAGE and AGE (demonstration)

A visit to ecological important places

Credit : 4
Hours/Week : 7 Code: RR6ZEL3
Medium of instruction: Tamil & English
SEMESTER - VI (For students admitted from 2015 onwards)

MEC3 – BIOTECHNOLOGY

Unit- I

Scope and importance - Genetic engineering - Gene cloning - Isolation of desired DNA - Introduction of rDNA into host - Identification, selection and expression of cloned DNA -Tools of genetic engineering – vector transposons - Gene manipulation in eukaryotes - Transgenic animals.

Unit- II

Molecular probes - Southern, Northern and Western blotting - Gene bank libraries - Polymerase Chain Reaction - Monoclonal antibodies production and uses- Applications of biotechnology in Medicine: hormones - gene therapy – grafting- fertility control- foetal sexing - forensic medicine.

Unit- III

Industrial Biotechnology: Fermentation - process of fermentation- upstream and downstream process - uses of fermenter.

Unit- IV

Biofertilizers - Microbes as fertilizers - culture methods - nitrogen fixation - nitrogen fixing organisms - mechanism of fixation - Biopesticides.Applications of Biotechnology in Biodiversity conservation.

Unit- V

Enzyme Biotechnology: Sources, uses and applications of enzymes- extraction of enzymes - preparation of crude enzymes- purification of enzymes - Immobilization of enzymes, Biotechnology and future -Patenting and ethical concerns.

REFERENCE BOOKS

- 1. IGNACIMUTHU, S.** (1998), Basic Biotechnology, Tata McGraw Hill publishing, Co., New Delhi.
- 2. KUMAR, H.D.** (1998), Modern Concepts of Biotechnology, Vikas Publishing House Pvt. Ltd., New Delhi.
- 3. BROWN, C.M., CAMPBELL, I. AND PRIEST, F.G.,** (1988), Introduction to Biotechnology, Blackwell Scientific Publications, UK.
- 4.PRIMROSE, S.B.** (2000), Modern Biotechnology, Blackwell Scientific publications, Oxford, London.
- 5. KESHAV TREHAN** (1996), Biotechnology, New Age International Pvt., Ltd., Publishers, New Delhi.

Question pattern

(Marks :75)

Time:3Hours

Part A : $10 \times 2 = 20$ Marks Answer All Questions (Two Questions from each Unit)

Part B: $5 \times 5 = 25$ Marks Answer All Questions (Either or type—Two questions from each Unit)

Part C : $3 \times 10 = 30$ Marks Answer ant Three Questions (One Question from each Unit)

Credit : 4

Hours/Week : 4

Code: RR5ZELO1

Medium of instruction: Tamil & English

SEMESTER - V (For students admitted from 2015 onwards)

NMEC1-ECONOMIC ZOOLOGY

Unit – I

Vermiculture and composting – types of earthworm – rearing technology management – vermin cast.

Unit – II

Apiculture – Species of honey bees hives- care and management – honey extraction – nutritive and medicinal value.

Unit – III

Sericulture- feeding and feeding habits of larva – Life cycle of Mulberry silkworm (Bombyxmori) – Economic importance of silkworm and silk.

Unit –IV

Fish culture – construction of ponds- management of pond – freshwater cultivable fishes – fish feed – fish diseases and management – brief study on prawn culture and pearl culture

Unit - V

Poultry farming type of poultry – management -poultry nutrition – diseases and their prevention – economics of poultry production

REFERENCE BOOKS

1. NIGAM, N.C. 2002. Economic ZooloS.Nagin& Co., New Delhi

2. Shukla, P.C., 2005. Economic Zooogy

Question pattern

(Marks :75)

Time:3Hours

Part A : $10 \times 2 = 20$ Marks Answer All Questions (Two Questions from each Unit)

Part B: $5 \times 5 = 25$ Marks Answer All Questions (Either or type–Two questions from each Unit)

Part C : $3 \times 10 = 30$ Marks Answer ant Three Questions (One Question from each Unit)

Credit : 4
Hours/Week : 4**Code: RR6ZELO2**
Medium of instruction: Tamil & English
SEMESTER –VI
(For students admitted from 2015 onwards)

NMEC2- PUBLIC HEALTH AND HYGIENE

Unit –I

Scope of health and hygiene – History of public health in India –Nutrition and health: Classification of foods. Growth and development – Growth chart, nutritional deficiency diseases – nutritional requirements of special groups- Balanced diet.

Unit –II

Environment and Health Management
Water: Water standards and purification of water
Air: Ventilation, discomfort prevention
Solid waste: Excreta disposal methods
Noise Pollution: Effects and treatments

Unit – III

Communicable Disease: Small pox, Measles, Mumps, Diphtheria, influenza, Tuberculosis
Intentional infection: Poliomyelitis, Cholera, Typhoid, Amoebiasis
Zoonosis: Rabis, Encephalitis and Plague

Unit – IV

Non-Communicable Disease: Coronary heart diseases, Hypertension, *Diabetic mellitus*, Obesity, Stroke, Blindness.

Unit - V

Occupational Health: Physical, Biological, Mechanical, Social and Psychological hazards
Mental Health: Alcohol and drug abuses
Health Education: Health plans of India- role of national and International Organization (WHO) in the Health care of the community.

REFERENCE BOOKS

BAAUMAN, R, 2007. Microbiology with diseases by Taxonomoy. Benjamin Cummings
PARK,K 2002. Park's Text Book of preventive and Social Medicine. 17thEdition., M/s. BanasidasBhanot Publishers.

Question pattern

(Marks :75)

Time:3Hours

Part A : $10 \times 2 = 20$ Marks Answer All Questions (Two Questions from each Unit)

Part B: $5 \times 5 = 25$ Marks Answer All Questions (Either or type–Two questions from each Unit)

Part C : $3 \times 10 = 30$ Marks Answer ant Three Questions (One Question from each Unit)

Credit : 4
Hours/Week : 4 **Code: RR1AZ1**
Medium of instruction: Tamil & English
SEMESTER -I (For students admitted from 2015 onwards)

BIOLOGY OF INVERTEBRATES AND CHORDATES – Allied -I

Unit – I

General characters of the Phyla based on the following types:

Phylum Protozoa: Protozoa -*Amoeba*

Phylum Porifera: Ascon sponges – Organisation and life history

Phylum Colenterata :*Obelia* – Organization and life history

Unit - II

General characters of the Phyla based on the following types:

Phylum :Plathyhelminthus: *Faciola hepatica* - Organization and life history

Phylum:Nemathelminthes : *Ascarislumbrioides*– Organization and life history

Phylum :Annelida:Reproductive system Earthworm

Unit - III

General characters of the Phyla based on the following types:

Phylum :Arthropoda : CockroachOrganization and life history

Phylum:Mollusca: Fresh water mussel –Organisation and life history

Phylum :Echinodermata: Starfish- Organization and life history

Unit -IV

General characters of the Phyla based on the following types:

Fish – Shark

Amphibia- Frog

Reptilia- Calotes

Morphology, digestive, respiratory, nervous, circulatory, excretory and reproductive systems

Unit -VGeneral characters of the Phyla based on the following types:

Birds –Pigeon

Mammalia – Rabbit

Morphology, digestive, respiratory, nervous, circulatory, excretory and reproductive systems

REFERENCE BOOKS

1.NIGAM, N.C. 1998. Invertebrate Zoology, S.Nigam& Co. New Delhi.

2.EKAMBARANATHA AYYAR. M and ANANTHAKRISHNAN, T.N. 2000. Manual of Zoology, Volume I – Invertebrate Zoology, KitabMahal, Allahabad.), S.Viswanathan Pvt. Ltd

3. JORDAN, E.L. & VERMA, P.S. 2005. Invertebrate Zoology, S.Chand& Co. New Delhi.

EKAMBARANATHA AYYAR. M and ANANTHAKRISHNAN, T.N. 2000. Manual of Zoology, Volume II – Invertebrate Zoology, KitabMahal, Allahabad.), S.Viswanathan Pvt. Ltd

4.PURANIL.P.G. & THAKUR, R.S. 2000. Invertebrates Zoology, S.Chand& Co. New Delhi

5.Majupuria, T.C., 2002. Introduction to chordates, S.NAgin& Co. New Delhi

Question pattern

(Marks :75)

Time:3Hours

Part A : $10 \times 2 = 20$ Marks Answer All Questions (Two Questions from each Unit)

Part B: $5 \times 5 = 25$ Marks Answer All Questions (Either or type–Two questions from each Unit)

Part C : $3 \times 10 = 30$ Marks Answer ant Three Questions (One Question from each Unit)

Credit : 4
Hours/Week : 4Code: RR2AZ2
Medium of instruction: Tamil & English
SEMESTER – II (For students admitted from 2015 onwards)

COMMERCIAL ZOOLOGY- Allied - II

Unit-I

Vermiculture and composting – suitable species for vermiculture - rearing technology and vermicompost preparation - economic importance of earthworm.

Unit-II

Apiculture- species of honey bees- types of bee hives- care and management - honey extraction- nutritive and medicinal value of honey.

Lac culture- Life cycle of lac insect-extraction of lac – economic importance of lac.

Unit-III

Sericulture - types and economically important silkworms and silks - life cycle of mulberry silkworm (*Bombyxmori*) – rearing of silkworm – diseases of silkworm - economic importance of silkworm and silk.

Unit-IV

Aquaculture - construction of pond - management of pond - freshwater cultivable fishes - fish feed - induced breeding - Brief study of prawn culture and pearl culture.

Unit-V

Poultry farming - types of poultry- poultry management - poultry nutrition- diseases and their prevention - economics of poultry production.

REFERENCE BOOKS

- 1. SHUKLA,G.S. AND UPADHYAY, V.B.** Economic zoology, Rastogi Publications.
- 2. SARADAR SINGH-** Bee Keeping in India
- 3. SANTHANAM-** Aquaculture
- 4. NANDHINI CHETTY-** Sericulture
- 5. SINGH-**Livestock and poultry farming.

Question pattern

(Marks :75)

Time:3Hours

Part A : $10 \times 2 = 20$ Marks Answer All Questions (Two Questions from each Unit)

Part B: $5 \times 5 = 25$ Marks Answer All Questions (Either or type–Two questions from each Unit)

Part C : $3 \times 10 = 30$ Marks Answer ant Three Questions (One Question from each Unit)

Credit : 4

Hours/Week : 2

Code: RR2AZP

Medium of instruction: Tamil & English

SEMESTER - II (For students admitted from 2015 onwards)

ALLIED ZOOLOGY- PRACTICAL – I

DISSECTION

Earthworm : Nervous system
Freshwater mussel : Digestive system
Cockroach : Digestive and nervous system
Fish : Viscera

MOUNTING

Earthworm - Penial and body setae
Appendages of Prawn
Honey bee and cockroach –mouthparts
Shark- Placoid scales

SPOTTERS

Amoeba, Paramecium (entire and conjugation), Obelia colony, Aurelia entire, *Fasciola hepatica* (W.M & T.S.), Redia, Cercaria, *Taeniasolium*- entire and scolex, Ascaris - male and female, Earthworm, Leach, Freshwater mussel, Star fish, Frog, Calotes, Pigeon and Rabbit.

Species of animals used in vermiculture, apiculture, lac culture, sericulture, aquaculture and poultry farming.

Products: Honey, beeswax, lac, silk, cod liver oil, pearl, egg of different poultry birds.