DEPARTMENT OF ZOOLOGY

B.Sc.-ZOOLOGY : III AND IV SEMESTERS

OR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2011 ONWARDS)

Course Code	Part	Course	Ins. Hrs/ week	Hours Exam	Max. marks		Total 100	Credit
					Intl	S.E		
III SEMESTER								
11UTL03	I	Tamil Paper - III	5	3	25	75	100	3
11UEN03	II	English Paper – III	6	3	25	75	100	3
11UZY07	III	Core Major Paper –IV Cell Biology	7	3	25	75	100	4
11UZY10		Major Practical – II	2	3	-	-	-	-
11UZY08		Allied Chemistry Paper – I	6	3	25	75	100	3
11UZY12		Allied Chemistry Practical	2	-	-	-	-	-
09HEC03	IV	*Yoga – Value Education : Professional Values	1	3	-	75	75	-
11UZYSA1/ 11UZYSB1		Skill Based Elective (Major) - I: Apiculture/ Ornamental Fish Culture	1	3	-	50	50	2
		Sub total	**30**				**525**	**15**
IV SEMESTER								
11UTL04	I	Tamil Paper - IV	5	3	25	75	100	3
11UEN04	II	English Paper – IV	6	3	25	75	100	3
11UZY09	III	Core Major Paper –V Genetics	7	3	25	75	100	4
11UZY10		Major Practical – II	2	3	40	60	100	5
11UZY11		Allied Chemistry Paper – II	6	3	25	75	100	3
11UZY12		Allied Chemistry Practical	2	3	40	60	100	4
09HEC04	IV	*Yoga – Value Education: Social Values	1	3	-	75	75	-
09HECP02		Yoga Practical-II – Value Education:	-	-	-	50	50	2
11UZYSA2/ 11UZYSB2		Skill Based Elective (Major)–II: Vermiculture/Food and Nutrition	1	3	-	50	50	2
	V	Extension Activities	Grading only					1

(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2011 ONWARDS)

11 UZY 07

B.Sc. – ZOOLOGY – THIRD SEMESTER SYLLABUS

CELL BIOLOGY

Credit : 4

Total Contact hours:91
Hours/Week:7

UNIT – I **(19Hrs)**

- Cell Theory: Salient features - Protoplasm theory - Germplasm theory and organismal theory.
- Scope of Cell Biology:
  - Virus – HIV
  - Prokaryotic Cell (E.coli bacterium)
  - Eukaryotic Cell (Typical animal cell)
- Organelles: Plasma membrane – structure – Trilaminar model - Bimolecular leaflet model and Fluid mosaic model. General functions of plasma membrane.

UNIT – II **(18Hrs)**

- Endoplasmic Reticulum: Ultra Structure – Rough and Smooth types - Functions.
- Ribosomes: Types – Chemical composition – Biogenesis of 70s, Function
- Golgi complex: Structure and Functions.
- Lysosomes: Polymorphism – Enzymes and Functions

UNIT – III **(18Hrs)**

- Mitochondria: Structure – mDNA - origin – General functions (or) cell respiration.
- Nucleus: Structure of interface nucleus and function.
- Nucleolus: Structure and function.
- Chromosomes: Structure – Giant chromosomes – Polytene and Lamp brush.

UNIT – IV **(18Hrs)**

- Nucleic acids – DNA Structure (Watson & Crick model)
  - Replication of DNA (Semi-conservative model)
  - Types of RNA
- Genetic Code – Salient features
- Protein synthesis – Central dogma and Central dogma reverse
  - Mechanism of protein synthesis – Components –

UNIT - V **(18Hrs)**

- Regulation of Gene Expression in prokaryotes – Enzyme induction, Enzyme repression and Feedback inhibition.
- Cell division – Cell cycle – Amitosis – Mitosis and Meiosis
- Cell aging – Causes – Changes and Apoptosis
- Cancer cells – Characteristics – Properties – Types – Diagnosis – Treatment and Oncogenes.

Text Book:

1. Cell Biology – N. Arumugam – Saras Publication – 2011

Reference Books:-

1. A text book of Cell biology – V.P.Verma & Agarwal – 2008
2. Cell Biology – De Robertis
3. Inside the Living Cell – J.A.V. Butler
4. Introductory Cytology – Veer Bala Rastogi – 2008

Reference in order.

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(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2011 ONWARDS)

11 UZYS A1

B.Sc. – ZOOLOGY – III SEMESTER SYLLABUS

SKILL BASED ELECTIVE – APICULTURE

Credit : 2 **Total Contact hours:13**
Hours/Week:1

UNIT I **(3Hrs)**

History of Apiculture
Classification
Species of honey bees
Social organization of honey bee colony

UNIT II **(3Hrs)**

Beehive
Selection of Bees for Apiculture
Extraction of honey

UNIT III **(2Hrs)**

Methods of Bee keeping: Indigenous and modern method of apiculture.
Appliances for modern method

UNIT IV **(2Hrs)**

Products of bee keeping:
- Honey - Chemical composition and importance of honey
- Bee wax
- Bee venom

UNIT V **(3 Hrs)**

Diseases and predators
Bee-keeping industry
Rural economy

Reference Books

1. An intorduction to Arthropoda- H.S. Bhamrah Kavita Juneja
2. Econmomic Entomology - N.T.Krishnan
3. Economic Zoology - Shukla. Upadhyay
4. Entomology - Apiculture - Muthukumar

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R THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2011 ONWARDS)

11 UZYS B1

B.Sc. – ZOOLOGY – III SEMESTER SYLLABUS

SKILL BASED ELECTIVE

ORNAMENTAL FISH CULTURE

lit : 2 **Total Contact hours:13**

Hours/Week:1

T : I **(3Hrs)**

- General characters of fishes
- Adaptations of Ornamental fishes to Natural and Artificial conditions
- Scope of Ornamental Fish culture
- Present status of Ornamental fish production.

T: II **(3Hrs)**

- Materials required
- Fabrication of Aquarium
- Indoor aquarium- Outdoor aquarium
- Proper location of aquarium.

T : III **(2Hrs)**

- Physico- Chemical characteristics of water and Soil
- Selection of fish and Feed formulation and live fish feed.
- Feeding and maintenance of aquarium
- Precautions

T : IV **(2Hrs)**

- Important Ornamental fish of Fresh water and marine water
- Selection and Breeding techniques of some Ornamental fishes
- Rearing technology of fry.

T: V **(3Hrs)**

- Common disease of Ornamental fishes
- Fish Parasites and their control
- Bio- remedies for fish disease.
- Popularisation of Ornamental fish culture for increasing trade and export.

(.....2.....)

REFERENCE :

1) In land fishery – Instructural – curn – Practical -Manual Vol IV Aquaculture – by A.K, Dhote.- Publication Department – NCERT – 1989 – 55

2) A hand book of fish farming – S.C Agarwal
First Published in 1994 B.H.Enterprises. New Delhi.

3) A Text book of fish& Fisheries Technology - Dr.K.P.Biswas, Calcutta(W.B) 2nd Edition,Published by Narendra Publishing house, Delhi 1996

4) Fish and Fisheries of India -V.G Jhingran, HindustanPublishingCorporation(India)Delhi,(1988),Printed in India at Gopsons papers Pvt Ltd, Noida

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R THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2011 ONWARDS)

11 UZY 09

B.Sc. – ZOOLOGY – FOURTH SEMESTER SYLLABUS

GENETICS

edit : 4

Total Contact hours:91

Hours/Week:7

IT –I **(19Hrs)**

- Mendel's monohybrid and di hybrid experiments - Mendel's Laws - Problems.
- Interaction of genes: Lethal genes – Epistasis
- Polygenic inheritance:

  Example: Skin colour in man 1:4:6:4:1
- Multiple alleles :
  - Example: Coat colour in Rabbit
  - ABO blood groups in man – Rh factor – problems

NIT – II **(18Hrs)**

- Linkage: Complete and incomplete linkage
- Chromosome maps: Interference and coincidence - chromosome map in Drosophila (Three Point Cross)
- Sex determination:-
  - XX – XY type – Human
  - ZZ –ZW type – Silk worm moth
  - Bridge's genic balance theory
  - Hymenopteran type – Honey bee
  - Gynandromorph – Drosophila
  - Hormonal control – Free Martin Cattle.

NIT – III **(18Hrs)**

- Sex linked inheritance:
  - Eye colour in Drosophila
  - Haemophilia and colour blindness in man – problems
- Non – disjunction:- Mitotic and meiotic non – disjunction
- Variation in chromosome number:- Euploidy and Aneuploidy

(..2……..)

UNIT –IV **(18Hrs)**

- Pedigree analysis

  ii) Syndromes: Autosomal – Down syndrome and Patau's syndrome.

  Allosomal – Klienfelter's syndrome and Turner's syndrome.

  iii) Twins

- Inborn Errors of metabolism: Phenylketoneuria, Alcaptonuria, Albinism.
- Eugenics: Positive and Negative eugenics.

UNIT – V **(18Hrs)**

- Nucleic acids as genetic material: DNA and RNA.
- Mutation: Detection of mutations – CIB method in Drosophila – Molecular basis of
- gene mutation – Substitution mutations and Frame shift mutations
- Population Genetics: Gene pool, Gene frequency and genotype frequency, Hardy – Weinberg law.

Text Book:

1. A text book of genetics – Veer Bala Rastogi – 2008

Reference Books:

1. Principles of Genetics – Sinnot Dunn Dobzhansky
2. Advanced Genetics – G. S. Miglani
3. Genetics – M. W. Strickberger
4. Principles of Genetics – Eldon J. Gardner
5. Essential Genetics – Peter. J. Russell
6. Human Genetics - E. A Carlson
7. Genetics – Verma and Agarwal - 2008
8. Genetics – Dr. R. P. Meyyan – 2009

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(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2011 ONWARDS)

11 UZY 10

B.Sc. – ZOOLOGY – FOURTH SEMESTER SYLLABUS

MAJOR PRACTICAL – II : CELL BIOLOGY AND GENETICS

(EXAMINATIONS AT THE END OF FOURTH SEMESTER ONLY)

Credit :5

Total Contact hours:52
Hours/Week:2

MAJOR:

CELL BIOLOGY

- Measurements of cell using
  - Stage Micrometer
  - Ocular Micrometer
- Squash preparation from Onion – Root tip – Mitosis

GENETICS

- Human Traits survey and gene frequency calculations
- Human pedigree construction and analysis of a family data.

MINOR:

CELL BIOLOGY

- Mounting of Polytene chromosomes
- Identification of squamous epithelial cells in buccal smear.

GENETICS

- Blood grouping in man
- Probability Test

SPOTTERS:

CELL BIOLOGY

- Human Immuno Deficiency Virus.
- E. Coli Bacterium
- A typical animal cell
- Polyribosome
- Polymorphism in Lysosome
- Interface Nucleus
- Lamp brush chromosome
- Mitosis - stages
- DNA – Watson & Crick Model
- t RNA – Structure

GENETICS

- Drosophilla – Male and Female
- Gynandromorph
- Hairy Pinna
- Twins
- Erythroblastosis Foetalis
- Kleinfelter's Syndrome
- Down Syndrome
- Turner's Syndrome
- Free – martin
- Sickle cell anemia

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(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2011 ONWARDS)

11 UZYS A2

B.Sc. – ZOOLOGY – IV SEMESTER SYLLABUS

SKILL BASED ELECTIVE - VERMICULTURE

Credit : 2
Hours:1hr/week

Total Contact Hrs: 13

UNIT I: **3Hrs**

Systematic position of Earthworm – Habit and Habitat
Commercial varieties of Earthworm for Vermicomposting
Economic importance of vermiculture

UNIT II: **3Hrs**

Type study: Earthworm: Megascolex sp
External character, Digestive system
Respiratory system
Excretory system
Reproductive system

UNIT III: **2Hrs**

Life cycle of Earthworm
Diseases and Predators of Earthworm
Control measures

UNIT IV: **2Hrs**

Types of soil
Biomass
Biodegradable wastes
Nutrient content of Soil and Biomass

UNIT V: **3Hrs**

Preparation of Vermibed
Maintenance of Composting pit
Collection of vermicompost
Nutrient value of vermicompost
Marketing of vermicompost

Reference Books:

1. Annelida – H.S Bhamrah Kavita Juneja
2. Modern text book of Zoology – R.L. Kotpal
3. A manual of Zoology – M. Ekambaranatha Iyer (Part -I)
4. Fundamentals of Ecology – E.P. Odum

FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2011 ONWARDS)

11 UZYS B2

B.Sc. – ZOOLOGY – IV SEMESTER SYLLABUS

SKILL BASED ELECTIVE - FOOD AND NUTRITION

redit : 2
lours:1hr/week

Total Contact Hrs: 13

NIT I **(3Hrs)**

- The scope of food and nutrition
- Composition of food (Protein, Carbohydrate, Fat, Vitamins and Minerals)
- Function and sources of food

NIT II **(3Hrs)**

- Measurement of energy and energy values of various food
- Energy requirements
- Balances diet
- Digestion and absorption

nit III **(2Hrs)**

- Milk – Types – importance in the diet
- Eggs – Structures and composition – importance in the diet
- Meat – Types – importance in the diet
- Cereals and pulses– Types – importance in the diet

NIT IV **(2Hrs)**

- Fish – Types, importance in the diet
- Vegetables – Types, importance in the diet
- Fruits – Types, importance in the diet
- Cereals and pulses – Types, importance in the diet

IIT V **(2Hrs)**

- Food spoilage
- Food poisoning- food borne diseases
- Food preservation
- Methods of purification of potable water
- Food laws

xt book

1. Food and nutrition – Anita Tull

ference book

1. Fundamentals of food and nutrition – Sumathi R. Mudambi and M. V. Rajagopal
2. Count what you eat – Swaran pasran pasricvha (NIN – Hyderabad)

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DEPARTMENT OF ZOOLOGY

B.Sc.-ZOOLOGY : V AND VI SEMESTERS

(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2010 ONWARDS)

Course Code	Part	Course	Ins. Hrs/ week	Hours Exam	Max. marks		Total 100	Credit
					Intl	S.E		
V SEMESTER								
10UZY13	III	Core Major Paper – VII Developmental Biology	5	3	25	75	100	4
10UZY14	III	Core Major Paper – VIII Biostatistics& Biophysics	5	3	25	75	100	4
10UZY15	III	Core Major Paper – IX Biotechnology	5	3	25	75	100	5
10UZY24	III	Major Practical - III	2	-	-	-	-	-
10UZY25	III	Major Practical - IV	2	-	-	-	-	-
10UZY16	III	Core Elective I Computer Applications in Biology & Bioinformatics	3	3	25	75	100	3
10UZY17	III	Core Elective Practical Computer Practical	2	3	10	40	50	1
10UZY18	IV	Core Elective II Aquaculture	4	3	25	75	100	3
08GKL01	IV	General Knowledge & General Awareness	SS	3	-	100	100	2
09HEC05	IV	*Yoga – Value Education	1	3	-	75	75	-
10UZYS03	IV	Skill Based Non Major Elective: Poultry Science & Management Technology	1	3	-	-	50	2
		Sub total	**30**				**775**	**24**

(.....2.....)

S. No	Course Code	Part	Course	Hrs/ week	Hours Exam	Max. marks Intl	Max. marks S.E	Total 100	Credit
VI SEMESTER									
1.	10UZY19	III	Core Major Paper – XII Biochemistry &Animal Physiology	5	3	25	75	100	5
2.	10UZY20	III	Core Major Paper – XIII Ecology & Evolution	5	3	25	75	100	4
3.	10UZY21	III	Core Major Paper – XIV Applied Biotechnology & Microbiology	5	3	25	75	100	4
4.	10UZY24	III	Major Practical - III	2	3	40	60	100	5
5.	10UZY25	III	Major Practical - IV	2	3	40	60	100	5
6.	10UZY22	III	Core Elective –III: Sericulture	4	3	25	75	100	3
7.	10UZY23	III	Core Elective IV: MLT	5	3	25	75	100	3
8.	10UZYS04	IV	Skill Based Non - Major Elective Vectors & Human Diseases	1	3	-	50	50	2
10.	09HEC06	IV	*Yoga – Value Education: Global Values	1	3	-	75	75	-
11	09HECP03	IV	Yoga Practical-III – Value Education	-	-	-	50	50	2
			Sub total	**30**				**875**	33

* Theory marks for Human Excellence (Yoga) not counted for total marks.

Part IV Components - Internal Examination only (Question Paper Setting & Valuation)
Yoga & Non Major Elective – conducted by Department of Human Excellence
SS – Self Study

Question Paper Pattern for CBCS from the academic year 2008 - 2009

Part – A
10 Questions - 10 X 1 = 10 marks – Multiple Choice

Part – B
5 Questions -5X5 =25 marks – Either or Pattern - (Short answer type)

Part – C
5 Questions -5X8 = 40 marks – Either or Pattern
Not more than two sub divisions either 'a' or 'b' - (Long answer type)

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OR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2010 ONWARDS)

10 UZY 13

B.Sc. – ZOOLOGY – FIFTH SEMESTER SYLLABUS

DEVELOPMENTAL BIOLOGY

redits : 4

ours/ Week : 5 **Total contact Hrs: 65**

nit I **(13Hrs)**

- Scope of developmental biology
- Branches of developmental biology
- Theroies- Preformation, Biogenetic, Gradient, Organizer
- Gametogenesis- Primordial germ cells, Spermatogenesis, Oogenesis
- Types of egg- Based on amount, distribution, shell and development
- Egg membranes- Primary, Secondary, Tertiary.

iit II **(13Hrs)**

- Fertilization– Mechanism, Theroies of fertilization – InVitro Fertilization(IVF)
- Parthenogenesis- Natural and Artificial
- Cleavage- Characteristics, Planes- meridional, vertical, equatorial and latitudinal
- Patterns of cleavage holoblastic and meroblastic
- Example : Cleavage in frog

it III **(13Hrs)**

- Formation of blastula and fate map in frog
- Gastrulation- salient features, Types of morphogenic movements (Epiboly, Emboly), Mechanism of morphogenetic movements
- Example; Gastrulation in frog
- Exo-gastrulation in frog

Unit IV **(13Hrs)**

- Chart showing the derivatives of germinal layers in vertebrates
- Organogenesis in Frog- Ectodermal (Brain)
  Mesodermal (Heart)
  Endodermal (Alimentary canal)
- Development and significance of foetal membranes in chick

(.....2.....)

(13Hrs)

Unit V

- Placentation in mammals- Classification based on foetal membranes, distribution of villi and histology
- Functions of placenta
- Experimental embryology – Spemann's experiments on Organizer
- Embryonic stem cells

Text book

1.Embryology- Dr.N.Arumugam- Saras Publication,114/35G, A.R.P Camp Road, Periavilai, Kottar Post, Nagercoil - 629002 , Tamilnadu, India, 2011

2.Chordate embryology- P S Verma& V K Agarwal S .Chand Publication, 2006

Reference books:

3. Developmental biology - WJ Berrill, McGraw-Hill Book Co, New York
4. An Outline of animal development – Davenport, Addison –Wesley, 1979 publishers, University of Michigan, 2010
5. Embryology - Balinsky, 5th Edition ,Philadelphia, Saunders College Publishing.
6. Stem cell biology - Damel R marshak, Richard l Gardner, David Gottlieb
7. Developmental Biology - R.M.Twyman, Viva Books Pvt.Ltd, Chennai

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OR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2010 ONWARDS)

10 UZY 14

B.Sc. – ZOOLOGY – FIFTH SEMESTER SYLLABUS

BIOSTATISTICS AND BIOPHYSICS

redits : 4
ours/Week : 5

Total contact Hrs: 65

NIT –I **(13Hrs)**

- **Collection of data**
  - Methods of collection – Random and non-random sampling
  - Primary and secondary data
- **Tabulation**
  - Parts of table
  - Simple and complex table
- **Diagrammatic presentation**
  - Line diagram
  - Bar diagram
  - Pie diagram
- **Measures of central tendency**
  - Arithmetic mean
    - ✓ Individual, Discrete and continuous series
  - Median
  - Mode

nit II **(13Hrs)**

- **Standard deviation**
  - Merits and demerits
  - Individual, discrete and continues series
- **Correlation**
  - Positive and negative correlation
  - Karl pearson's coefficient of correlation
- **Regression analysis**
  - Types and methods

(..2.....)

Unit III **(13Hrs)**

- **Chi-square Test**
  - Degree of freedom
  - Null hypothesis
- **Student's T- test** – Properties and Applications
- **Analysis of Variance (ANOVA)** - One-way analysis

Unit – IV **(13Hrs)**

- **Scope of biophysics**
- **Thermodynamics principles**
  - First and second law
- **Bioluminescence**
  - Types
  - Mechanisms
  - Functions

Unit V **(13Hrs)**

- **Instrumentation**
  - Compound microscope
  - Electron microscope - Transmission Electron Microscope (TEM) and Scanning Electron Microscope (SEM)
  - Chromatography - Thin layer chromatography (TLC)
  - Electrophoresis – Polyacrylamide Gel Electrophoresis (PAGE)

Text Book

1. Basic concepts of Biostatistics – Dr. N. Arumugam- Saras publication (2011)
2. Biophysics and Instrumentation - Dr. N. Arumugam and V. Kumaresan, Saras publication 2011

Reference Book

1. Fundamentals of biostatistics – Veer Bala Rastogi, 2009
2. Biostatistics – Gupta, 2007
3. Elementary Biophysics –P. K. Srivastava, 2005
4. Biophysics – Principles and Techniques- M. A. Subramanian, 2005

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(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2010 ONWARDS)

10 UZY 15

B.Sc. – ZOOLOGY – FIFTH SEMESTER SYLLABUS

BIOTECHNOLOGY

Credit : 5

Hours/Week: 5 **Total Contact hours: 65**

Unit: I **(13Hrs)**

- Introduction, scope and importance of biotechnology
- Construction of Recombinant DNA
- Plasmids pBR 322
- Cosmids
- Transposons
- Genomic Library

Unit: II **(13Hrs)**

- Established cell lines – Kinetics of cell growth
- Polymerase Chain Reaction (PCR) – Applications of PCR in Biotechnology
- Hybridomas
- Monoclonal Antibodies
- DNA Finger printing

Unit: III **(13Hrs)**

- Production of Human Growth Hormone
- Vaccines
- Corticosteroids
- Gene Replacement Theory – Interferons and cytokines
- Production of L. lysine, L. threonine and Tyrosine
- Biochips

Unit: IV **(13Hrs)**

- Conversion of Hemicellulose and Lignin
- Sewage treatment by anaerobic digestion
- Conversion of waste into biogas and compost
- Cell free hydrogen production
- Bioremediation

(..2.....)

UNIT – V **(8 Hrs)**

- Protein prediction
- Similiarity Search
- Representative of biomolecules as stings of symbols
- Pylogenetic analysis
- Drug designing.

Text Books:

1. Microsoft Office- Joyce Cox and Polly Urban.
2. Fundamentals of computer – V.Rajaraman, Prentice Hall of India Pvt.Ltd, New Delhi -110001, 1986
3. Genomic Bioinformatics- (2010) C. Subramanian – Dominent Publisher, New Delhi ,

Reference books:

4. Working in Microsoft office- Ron Mansfield, McGraw-Hill Book Co, New York
5. Bioinformatics-Orpita Bosu, Simminder Kaur Thukral, Oxford University Press, New Delhi 110001
6. Introduction to Bioinformatics - T.K. Attwood and D.J. Parrysmith, Addison Wesley Longman, Harlow; 1999;
7. Bioinformatics – Applications in Life and Environmental Sciences (2009) Eds., M.H. Fuelker , Capital Publishing Company, New Delhi.
8. Basic Bioinformatics – S. Ignacimuthu, Narosa Publishing House, New Delhi.
9. A text book of Bioinformatics – Sharma, Munjal, Shankar, Rastogi Publications, Meerut, India, 2008
10. Essential Bioinformatics (2006) by Jin Xiong, Cambridge University Press pp 339.

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(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2010 ONWARDS)

10 UZY 17

B.Sc. – ZOOLOGY – FIFTH SEMESTER SYLLABUS

CORE ELECTIVE PRACTICAL – COMPUTER PROGRAMMING LAB PRACTICAL

Credit : 1

Hours/Week: 2

Total Contact hours:26

1. Creating, editing and printing a document in MS Word.
2. Creating a table in MS Word.
3. Mail Merging.
4. Preparation of worksheet in MS-Excel
5. Creating a chart in Ms – Excel.
6. Preparation of slides for presentation in Ms-Power Point.
7. Database – Creation and Querying in Ms- Access.
8. Web browsing and E-Mailing (Demonstration)
9. Gene finding and protein prediction (Demonstration)
10. Bio-molecular visualization using (Demonstration) RasMol.

Reference Books:

1. Introduction to Bioinformatics – (1999) – by T.K. Attwood and D.J. ParrySmith Longman Publications.
2. "A practical guide to the analysis of genes and proteins (1997) Wiley Inter science.
3. Microsoft Office - Joyce Cox and Polly Urban.

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(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2010 ONWARDS)

10 UZY 18

B.Sc. – ZOOLOGY – FIFTH SEMESTER SYLLABUS

CORE ELECTIVE PAPER - AQUACULTURE

Credit : 3 **Total Contact Hrs: 52**

Hours: 4hr/week

Unit I **(12hrs)**

- Scope of aquaculture
- Culture methods
  - mono culture
  - poly culture
  - integrated culture
- Methods of fish farming
  - Fish farm design
  - Selection of site and maintenance
- Home aquarium
  - Construction and maintenance

Unit II **(10hrs)**

- Classification of fishes upto order level with example
  - Type study
    - Teleost – Mullet : Morphology and anatomy

Unit III **(10hrs)**

- Bionomics of some important fishes
  - Indian major carp - Catla
  - Exotic fishes - Common carp
  - Marine fish - Sardine

Unit IV **(10hrs)**

- Fishery by-products
- Preservation methods
  - Freezing
  - Drying
  - Canning
  - Salting

(..2.....)

- Fish product spoilage – causes and remedy
- Fish diseases
  - Bacterial
  - Fungal
  - Viral

Unit V **(10hrs)**

- Prawn culture
  - Common cultivable species
- Oyster culture
  - Cultivable marine species
- Governing organizations
  - Central Marine Fisheries Research Institute (CMFRI)
  - Marine Products Exports Development Authority (MPEDA)

Text book

1. Dr. K. Shanmugham, 1992. Fishery biology and aquaculture , LEO Pathippagam, Madras
2. Charls L Cutting, 1999. Fish processing and preservation. Agrobotanical publishers (India)

Reference book

1. Vadapalli and Satyanarayanan, 1996. Fish culture. Narendra publishing house, Delhi.
2. Mary Chandy, 1994. Fish. Published by the director, National Book Trust, India.
3. Datta Munshi and Srivastava, 1988. Natural history of fishes and systematic of Fresh-water fishes of India. Narendra Publishing House, New Delhi.
4. E. L. Jordan and P. S. Verma. 2000. Chordate Zoology. S. Chand and company LTD, New Delhi
5. Dr. S. C. Agarwal. 1994. A hand book on fish farming. Narendra publishing house. Delhi
6. Pandey and Shukla, 2010. Fish and fisheries. Rastogi publication

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(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2010 ONWARDS)

10 UZYS 03

B.Sc. – ZOOLOGY – V SEMESTER SYLLABUS

SKILL BASED ELECTIVE

POULTRY SCIENCE AND MANAGEMENT TECHNOLOGY

Credit : 2

Total Contact hours:13
Hours/Week:1

UNIT : I **(3Hrs)**

- Importance and role of the poultry in rural development and employment potential.
- Anatomy and physiology of poultry birds (hen) with reference to digestive and reproductive systems.

UNIT : II **(3Hrs)**

- Poultry house and equipment
- Space requirements
- Types of houses
- Number of birds
- Equipment for feeding and drinking. Summer management, Winter management Sterilization of room

UNIT – III **(2Hrs)**

- Classification of feed stuffs
- Availability of raw materials and their cost
- Feed formulation and Feeding programme

UNIT - IV **(3Hrs)**

- Management of Broilers
- Management of layers
- Breeders
- Optimum conditions
- Common diseases – Bird flu disease
- Antibiotics, Vaccination and deworming
- Insecticide treatment and Bio-remedies

(.....2.....)

UNIT - V **(2Hrs)**

- Nutritive value of poultry meat and egg
- Grading and Preservation of eggs
- Packing and Transport and Marketing
- Relationship with customers
- Different uses of eggs
- Poultry manure.

Reference Books

1) Rice . E.J and Botosford . H.E. – Practical poultry management . John Wiley, Hansen Inc. N.Y.
2) Gnanmani. J . Profitable poultry product ; Pyton publ. Co. Madurai, Tamilnadu
3) Siddiqui. H.M Manual of poultry production Practicals : College of Veterinary Science, Andrapradesh.
4) Shukla . G.S.and Upadhyay. V.B. Economic Zoology Rostogi Publication

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10 UZY 19

B.Sc. – ZOOLOGY – SIXTH SEMESTER SYLLABUS

BIOCHEMISTRY AND ANIMAL PHYSIOLOGY

Credits : 5
Hours/ Week : 5 **Total contact Hrs: 65**

Unit I **(13Hrs)**

- **Classification of carbohydrates:**
  - Monosaccharides - Pentoses, hexoses
  - Disaccharides - Non-reducing sugar C1- C1 – Sucrose
    - Reducing Sugar C1 – C4 – Lactose
  - Polysaccharides - Homopolysaccharide - Starch
    Heteropolysaccharide - Heparin
- **Classification of Lipids:**
  - Simple Lipids Fats and Waxes
  - Compound lipids Phospholipids, Glycolipids
  - Derived lipids Glycerol, fatty acids and Cholesterol
- **Classification of proteins:**
  - Based on structure - Simple, Conjugated, Derived
  - Based on solubility- Globular, Fibrous

Unit II **(13Hrs)**

- **Metabolism:**
  - Metabolism of carbohydrates: Glycolysis, Glycogenesis, Kreb's cycle & Glycogenolysis
  - Metabolism of lipids :β-oxidation of fatty acids
  - Metabolism of proteins :Transamination, Deamination
- **Hormones:**
  - Peptide hormone : Insulin & Glucogan
  - Steroid hormone : Androgen, Oestrogen & Progesterone

Unit III **(13Hrs)**

- **Respiration:**
  - Types Anaerobic & Anaerobic
    Respiratory pigments
    O_2 and CO_2 transport
- **Circulation:**
  - Types Myogenic & Neurogenic heart
    Pacemaker and electrical activity of heart in man
    Composition and functions of blood
    Composition and functions of Lymph
- **Excretion:**
  Structure of mammalian kidney
  Structure of Nephron
  Synthesis of ammonia, urea and uric acid
  Formation of urine

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Unit IV: **(13Hrs)**

- **Water Balance:**
  - Osmatic and Ionic regulations in aquatic animal (Fish)
- **Receptors:**

  Chemoreceptors, olfactoreceptors,
  Photoreceptor (Eye)
  Phonoreceptor (Ear)
- **Effectors:**
  - Types of muscles — Striped, unstriped and cardiac muscles
    Structure and properties of striped muscle
    Mechanism of muscular contraction- sliding filament theory.

Unit V: **(13Hrs)**

- **Nervous system:**
  - Structure of vertebrate neuron
  - Conduction of nerve impulse through – Non-myelinated neuron
    - Synapse
    - Neuromuscular junction
- Reflex action and reflex arc
- Reproductive system: Sexual cycle in human: Oestrous cycle, puberty, spermiation, ovulation, menstrual cycle, pregnancy and parturition.
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Text books:

1. Biochemistry - Thulsi Fatima, Saras Publication,114/35G, A.R.P Camp Road, Periavilai, Kottar Post, Nagercoil - 629002 , Tamilnadu, India
2. Animal physiology- N. Arumugam Saras Publication, 2009, 114/35G, A.R.P Camp Road, Periavilai, Kottar Post, Nagercoil - 629002 , Tamilnadu, India

Reference books:

3. Outline of animal physiology - Parameswaran, Ananthakrishnan& Ananthasubramaniam, S. Viswanathan printers & Publishers Pvt. Ltd, 1991
4. Animal physiology - P S Verma, Tyagi and Agarwal. Chand& company ltd 1997
5. Comparative animal physiology -Prosser L. Sathish book seller Agra
6. Basic Physiology – S. Sree Kumar, PHI Learning Pvt. Ltd, New Delhi, 110001, 2010 Edition.
7. A text book of Animal Physiology – A.K.Berry, EMKAY Publication, New Delhi-110051
8. Biochemistry - SC Rastogi, Tata McGraw-Hill Education, 2010
9. Essential of biochemistry - U.Sathyanarayana & U. Chakrapani, 2nd Edition, Reprinted 2009, Books & Allied pvt.ltd 83/1, Beliaghata main road, Kolkata 700010, India
10. Fundamentals of biochemistry J L Jain S Chand & campany Ltd New Delhi

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(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2010 ONWARDS)

10 UZY 20

B.Sc. – ZOOLOGY – SIXTH SEMESTER SYLLABUS

ECOLOGY AND EVOLUTION

Credits : 4
Hours/ Week : 5

Total contact Hrs: 65

Unit I **(13Hrs)**

- **Scope of ecology**
- **Abiotic factors**
  - Soil –Pedogenesis - Soil texture- Soil profile – Soil fauna.
  - Water - Prosperity of water
  - Temperature – Range of temperature- Thermal stratification- biological effects of temperature
  - Light - light on water – biological effects of light

Unit II **(13Hrs)**

- **Biogeochemical cycle**
  - Gaseous cycle – Carbon cycle- Nitrogen cycle
  - Sedimentary cycle – Sulphur cycle- Phosphorus cycle
- **Anima relationship**
  - Commensalism
  - Mutualism
  - Parasitism
- **Animal population**
  - Characteristics of population - Natality, mortality, growth, density, dispersion, population fluctuation
- **Hunan population**
  - Population explosion and control measures

Unit III **(13Hrs)**

- Biochemical origin of life
- Urey and Miller's experiment
- Geological time scale
- **Fossils**: Types and Dating of fossils

Unit IV **(13Hrs)**

- **Evidences of evolution**
  - Morphological: Homologous structures – vestigial organs – connecting links
  - Embryological: Recapitulation theory
  - Palaeontological : Missing links

Unit V **(13Hrs)**

- **Darwinism**
  - Over production – variation – survival of the fittest – struggle for existence – origin of species
- **Isolating mechanism**
  - Geographic isolation
  - Reproductive isolation
- **Organic evolution of man**

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Text book

1. Concept of ecology – N. Arumugam - Saras publication (2009)
2. Organic Evolution– N. Arumugam - Saras publication (2009)
3.

Reference

1. Fundamentals of ecology – E. P. Odum
2. Fundamentals of animal Ecology – Anantha Krishnan J. N.
3. Principles of Ecology – Verma and Agarwal
4. Animal Ecology and Distribution of animals – Veer Bala Rastogi
5. Organic evolution – Lull
6. Evolution of vertebrates – E. H. Colbert
7. Evolutionary Biology – Tomar and Singh

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(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2010 ONWARDS)

10 UZY 21

B.Sc. – ZOOLOGY – SIXTH SEMESTER SYLLABUS

APPLIED BIOTECHNOLOGY AND MICROBIOLOGY

Credits : 4

Hours/ Week : 5 **Total contact Hrs: 65**

Unit: I **(13Hrs)**

- **Gene Cloning** – Insulin gene – Application of Gene Cloning
- Gene map of DNA
- Insertion of desired DNA into vector DNA
- Cohesive end ligation, Blunt end ligation and Homopolymer tailing.

Unit : II **(13Hrs)**

- **Blotting Techniques:**
  - Southern Blotting
  - Northern Blotting
  - Western Blotting
- Agrobacterium Tumefaciens – Ti Plasmids
- T-DNA – Integration of T-DNA into Chromosomal DNA
- Transgenic animals – Mice

Unit: III **(13Hrs)**

- **Biological Nitrogen Fixation**:
  - Definition
  - Non-Symbiotic and Symbiotic nitrogen fixation
  - Nif genes of Klebsiella Pneumoniae
  - Gene transfer for nitrogen fixation
- Bacillus thuringiensis as a Biopesticide
- Blue Green Algae (BGA)
- Biofertilizer

  Mycoherbicides

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Unit: IV **(13Hrs)**

- **Fermentation technology:**
  - Industrial production of Ethanol and Penicillin
- Removal of metals from water
- Microbial enhancement of oil recovery
- **Animal Tissue Culture**
  - Explants
  - Culture media
  - Culture of animal tissues

Unit: V **(13Hrs)**

- **Enzyme Engineering:**
  - Microbial production of enzymes,
  - Extraction, separation, purification and storage of enzymes
  - Immobilization of enzymes
- Industrial applications of microbial enzymes
- Intellectual Property Rights
- Patenting
- Bioethics

Text book

1.Biotechnology – V. Kumaresan 2011, Saras publications,14/35G, A.R.P CampRoad, Periavilai, Kottar Post, Nagercoil - 629002 , Tamilnadu, India

2. Elements of biotechnology – P.K. Gupta. 2004, Rastogi publications, Meerut

Reference books

3. Basic Biotechnology – Dr. S. Ignacimuthu, 1995, Tata McGraw Hill Publishing Company Ltd, New Delhi.
4. A text book of Biotechnology – R.C. Dubey, 1996, Cambridge University Press
5. Molecular Biology and Biotechnology – 1993, S.Chand & Company Ltd, NewDelhi
6. Biotechnology – John.E.Smith, 1993, Vikas Publishing House Pvt. Ltd, New Delhi

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(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2010 ONWARDS)

10 UZY 22

B.Sc. – ZOOLOGY – SIXTH SEMESTER SYLLABUS

CORE ELECTIVE PAPER - SERICULTURE

Credit : 3
Hours/Week: 4

Total Contact hours: 52

UNIT : I **(10 Hrs)**

- Definition and History of Sericulture
- Varieties of silkworms:
- Bombyx mori
  - Tasar, Muga and Eri silk worms
- Uses of silk
- Moriculture: Optimum conditions for mulberry growth
- Preparation of land
- Planting systems

UNIT : II **(11 Hrs)**

- Methods of Propagation – Cutting, Layering, Root and shoot grafting
- Pruning: Low cut–Middle cut–High cut–step up–Step down and
- Rejuvenation pruning
- Methods of Leaf harvesting
- Preservation of leaves
- Diseases of Mulberry: Fusarium Root Rot – Powdery Mildew – Leaf Blight - Dwarf disease

UNIT: III **(10 Hrs)**

- Life cycle of Bombyx mori
- Silk gland
- Grainages
- Incubation and Brushing
- Silkworm rearing appliances

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UNIT : IV **(11 Hrs)**

- Disinfection
- Rearing of mature larvae: Shelf and Floor rearing
- Diseases of silk worms: Pebrine – Viral Flacherie – Grasserie and
- Nuclear Polyhedrosis
- Mounting: Methods and precaution during mounting
- Indian Uzi fly (Pest of silk worm)

UNIT : V **(10 Hrs)**

- Physical characteristics of cocoons
- Defective cocoons
- Cocoon cooking for Top reeling
- Country Charkha (Reeling appliance)
- Cocoon Markets
- Raw silk testing

TEXT BOOK

1. An Introduction to sericulture – G. Ganga and J. Sulochana Chetty. Second Edition Oxford and IBH Publishing Co. PVT. LTD.

REFERENCE BOOKS

2. Hand Book of practical sericulture – Ullal and Narasimhanna. M.N. 2nd Ed. SBS Publishers, Bangalore
3. Manual on sericulture – FAO, Central Silk Board Bangalore.
4. A hand book for sericulture – N. Ezhili & K. Thirumathal , Shrishti Impression, Coimbatore

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(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2010 ONWARDS)

10 UZY 23

B.Sc. – ZOOLOGY – SIXTH SEMESTER SYLLABUS

CORE ELECTIVE PAPER
MEDICAL LABORATORY TECHNIQUES (MLT)

Credit : 3
Hours: 5hrs/week

Total Contact Hrs: 65

Unit I **(13hrs)**

- Scope of medical laboratory techniques
- General procedure – cleaning, sterilization and disposal of infected materials
- Safety measures and first aid
- Ethics for medical laboratory techniques

Unit II **(13hrs)**

- Laboratory instruments – Albuminometer – Urinometer – Haemocytometer - Sahil's haemometer - ECG and EEG - B. P. apparatus and stethoscope
- Preparation of the reagents and their uses – R. B. C. diluting fluid - W. B. C. diluting fluid - Anticoagulants

Unit III **(13hrs)**

- Hematology – blood collection – bleeding time and clotting time - blood cell counting of RBC and WBC - Estimation of haemoglobin - blood sugar estimation - glucose tolerance test for diabetes - types of anemia - examination of lipid profile - basic principles of blood transfusion – ELISA test.

Unit IV **(13hrs)**

- Urine analysis
    - Collection of urine
        - Physical examination: Volume- colour and appearance-odour-reaction-Specific gravity
        - Chemical examination: Glucose- albumin-bile pigments- urobilinogens
        - Microscopic analysis: Cell and casts
- Sputum analysis
    - Collection of sputum
        - Physical examination: Quantity- odour- colour
        - Microscopic analysis: Cell- casts- crystals

(….2……)

Unit V **(13hrs)**

- Stool examination
  - Collection of Stool
    - Physical examination: Quantity-consistency-colour-odour-reaction
    - Microscopic examination: Identification of various intestinal parasites
    - Fractional test mea for acidity
- Semen analysis
  - Collection of semen
    - Physical examination: Volume- odour- colour-reaction
    - Microscopic analysis: Motility-total count-Abnormal spermatozoa
    - Cryopreservation of semen

Text book

1. K. M. Samuel, 1982. Notes on clinical lab techniques. K. Gopalan publishers, Madras

Reference book

1. K. N. Sachdev, 1991. Clinical pathology and bacteriology. Jaypee brothers- medical publishers, New Delhi
2. John Macleod and John Munro, 1988. Clinical examination, ELBS publishers

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(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2010 ONWARDS)

10 UZY 24

B.Sc. – ZOOLOGY – SIXTH SEMESTER SYLLABUS

MAJOR PRACTICAL III

(DEVELOPMENTAL BIOLOGY, BIOSTATISTICS& BIOPHYSICS, BIOCHEMISTRY & ANIMAL PHYSIOLOGY & MLT)

Credit : 5

Hours: 2hrs/week **Total Contact Hrs:52**

Major

- Survey of digestive system in cockroach
- Estimation of oxygen consumption in an aquatic animal (Fish)
- Qualitative detection of Excretory products
- Calculate the standard deviation of the given samples
- Total count of RBC
- Total count of WBC

Minor

- Estimation of carbohydrates(Benedicts test), protein and lipid
- Find the mean of the given samples
- Draw a pie diagram to the given data
- Estimation of heamoglobin
- Qualitative test of albumin and urobilinogen in urine samples
- Detection of bile salts and bile pigments in urine samples
- Preparation of Blood smear
- Estimation of albumin using albuminometer

SPOTTERS

Developmental biology

- Frog- Egg, Cleavage, Gastrula, Yolk plug
- Chick- Egg, 24 hours, 72 hours, 96 hours
- Mammal- Placenta of sheep and Human foetus

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Animal physiology

- Mammalian Eye
- Mammalian Ear
- Mammalian Heart
- Mammalian Kidney

Biostatistics and Biophysics

- Simple bar diagram
- Multiple bar diagram
- Histogram
- Frequency polygon
- Compound microscope
- Electron microscope (TEM)
- Thin Layer Chromatography (TLC)
- Electrophoresis – PAGE

MLT

- Clininal thermometer
- Heamocyto meter
- Sahli's heamometer
- Albuminometer
- BP apparatus
- ECG
- Urinometer
- Centrifuge
- Autoclave
- Oven

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(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2010 ONWARDS)

10 UZY 25

B.Sc. – ZOOLOGY – SIXTH SEMESTER SYLLABUS

MAJOR ZOOLOGY PRATICAL – IV

(ECOLOGY AND EVOLUTION, BIOTECHNOLOGY AND MICROBIOLOGY, SERICULTURE AND AQUACULTURE)

Credit : 5

Hours: 2hrs/week **Total Contact Hrs: 52**

MAJOR

- Estimation of dissolved oxygen in water samples.
- Milk Methylene Blue Test
- Silkworm: Digestive system, Nervous system
- Silk pupa: Reproductive system
- Morphology and morphometric measurements of fish (demonstration only)

MINOR

- Estimation of salinity in water samples
- Determination of pH in water samples
- Culture medium preparation
- Hanging drop preparation
- Silkworm – Silk gland
- Mounting of placoid scales.

SPOTTERS

Ecology

- Sacculina on Crab
- Leech
- Taenia
- Physalia
- Albunea
- Hippa
- Anguilla

(….2……)

Biotechnology

- E-Coli
- Plasmids
- Bt – Bacillus thuringiensis
- Biodiesel Plant – Jatropha
- PCR
- Laminar Air Flow
- Gel Electrophoresis

Sericulture

- Life cycle of Bombyx mori
- Silkworm
- Cocoon
- Mulberry leaf
- Chandrika / Netrika
- Leaf chamber

Aquaculture

- Common Carp
- Preservation method – sundrying
- Fish parasite – Argulus

Evolution

- Coccyx
- Forelimb modifications.
- Fossil
- Peppered moth
- Vermiform appendix

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(FOR THE CANDIDATES ADMITTED FROM THE ACADEMIC YEAR 2011 ONWARDS)

10 UZYS 04

B.Sc. – ZOOLOGY – VI SEMESTER SYLLABUS

SKILL BASED ELECTIVE - VECTORS AND HUMAN DISEASES

Credit: 2

Hours: 1hr/week
Total Contact Hrs:13

Unit I **(3hrs)**

- Vectors and their morphological adaptation
- Life cycle of
  - Mosquito (*Culex* and *Aedes*)
  - House fly

Unit II **(3hrs)**

- Transmission of infectious diseases like
  - Malaria
  - Filariasis
  - Dengue

Unit III **(3hrs)**

- Vector control using insecticide and pesticides
  - Organochlorine
  - Organophosphorus
  - Pyrethroids

Unit IV **(2hrs)**

- Vector control using bacterial pesticide
- Natural and traditional methods for the control of mosquito larvae
  - Spraying of oil
  - Introducing larvivorus fish

Unit V **(2hrs)**

- Problems of vector control
  - Insecticide resistance
- Integrated vector management approaches.

Reference book

1. Ekambaranatha Iyar and T.N.Ananthakrishnan. 1992. A Manual of Zoology, Vol.I(Invertebrata). Parts I & II. Viswanathan & Co.
2. Jordon, E.L. and P.S.Verma. 1995 Invertebrate Zoology. 12th edn. Sultan Chand & Co.
3. Kotpal, R.L., Arthropoda, Mollusca – Rastogi Publications.
4. Shukla.G.S & V.B.Upadhyay, 1998. Economic Zoology, Rastogi Publication, Meerut
5. Zulfikar S Patel, 2010. Chemical toxicology, Dominant publishers and distributors, New Delhi.

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