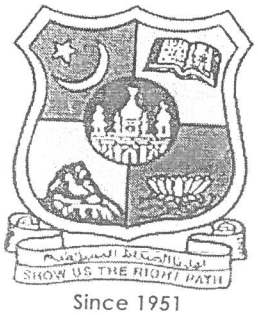
B.Sc Zoology

POST GRADUATE DEPARTMENT OF ZOOLOGY



Since 1951

Course Pattern

(2014 – 15 onwards)

UG, PG, M. Phil., and COP ZOOLOGY

DEPARTMENT OF ZOOLOGY: UG COURSE PATTERN (2014 – 2015 ONWARDS)

SEM	SUB CODE	PART	COURSE	SUBJECT TITLE	HRS / WEEK	CREDIT	CIA Mark	SE MARK	TOTAL MARK
I	14 U1LT1/LA1/ LH1/LU1/LF1	I	Language - I		6	3	40	60	100
	14 UCN1E1	II	English - I		6	3	40	60	100
	14 UCH1A1:2	III	Allied I	Inorganic and Organic Chemistry	5	2	20	30	50
	14 UCH 1A1P	III	Allied I	Volumetric Analysis Practical	3	2	20	30	50
	14 UZO1C1	III	Core I	Biology of Invertebrates	4	4	40	60	100
	14 UZO1M1 P	III	Major Based Elective – I	Bio. of Invertebrates Practical	3	3	40	60	100
	14 UCN1VE	IV	Value Education	Value Education	3	3	40	60	100
TOTAL					**30**	**20**	**240**	**360**	**600**
II	14 U2LT2/LA2/ LH2/LU2/LF2	I	Language - II		6	3	40	60	100
	14 UCN2E2	II	English- II		6	3	40	60	100
	14 UCH2A2: 2	III	Allied II	Bio-organic chemistry	4	2	20	30	50
	14 UCH2A2P	III	Allied II	Organic Analysis Practical	3	2	20	30	50
	14 UZO 2C2	III	Core II	Biology of Chordates	4	4	40	60	100
	14 UZO 2M2P	III	Major Based Elective – II	Bio. of Chordates Practical	3	3	40	60	100
	14 UZO 2N1	IV	Non-Major Elective – I	Vermiculture Technology	2	2	40	60	100
	14 UCN 2ES	IV	Environmental Studies	Environmental Studies	2	2	40	60	100
TOTAL					**30**	**21**	**280**	**420**	**700**
III	14 U3LT3/LA3/ LF3/LH3/LU3	I	Language - III		6	3	40	60	100
	14 UCN3E3	II	English -III		6	3	40	60	100
	14 UBO 3A3	III	Allied III	Morphology, Taxonomy, Anatomy Embryology	4	2	20	30	50
	14 UBO 3A3P	III	Allied III	Morphology, Taxonomy, Anatomy Embryology Practical	3	2	20	30	50
	14 UZO 3C3	III	Core III	Cell and Molecular Biology	4	4	40	60	100
	14 UZO 3M3P	III	Major Based Elective - III	Cell and Molecular Biology Practical	3	3	40	60	100
	14 UZO 3N2	IV	Non-Major Elective – II	Health Education	2	2	40	60	100
	14 UZO 3S1	IV	Skill Based Elective - I	Soft Skills	2	2	40	60	100
TOTAL					**30**	**21**	**280**	**420**	**700**
IV	14 U4LT4/LA4/ LF4/LH4/LU4	I	Language - IV		6	3	40	60	100
	14 UCN4E4	II	English - IV		6	3	40	60	100
	14 UBO 4A4	III	Allied IV	Thallophytes Bryophytes Pteridophytes Gymnosperms and Plant Physiology	5	2	20	30	50
	14 UBO 4A4P	III	Allied IV	Thallophytes Bryophytes Pteridophytes Gymnosperms and Plant Physiology Practical	3	2	20	30	50
	14 UZO 4C4	III	Core IV	Animal Physiology	4	4	40	60	100
	14 UZO 4C5P	III	Core V	Animal Physiology Practical	4	4	40	60	100
	14 UZO 4S2	IV	Skill Based Elective - II	Aquaculture	2	2	40	60	100
	14 U CN4EA	V	Extension Activities	NCC, NSS, etc.	-	2	-	-	-
	14 UZO 4EC1		Extra Credit-1	Natural Resource Management	-	4*	-	100*	100*
	14 UZO 4EC2		Extra Credit-2	Wild Life Biology	-	4*	-	100*	100*
TOTAL					**30**	**22**	**240**	**360**	**600**

V	14 UZO 5C6	III	Core VI	Biostatistics, Bioinformatics & Computer Applicatior	5	4	40	60	100
	14 UZO-5C7	III	Core VII	Genetics	4	4	40	60	100
	14 UZO 5C8	III	Core VIII	Microbiology	4	4	40	60	100
	14 UZO5C9	III	Core IX	Developmental Biology	4	4	40	60	100
	14 UZO 5C10	III	Core X	Biotechnology	4	4	40	60	100
	14 UZO 5C11P	III	Core XI	Biostatistics, Bioinformatics & Computer Application, Genetic Zoology , Microbiology , Developmental Biology Biotec Practical	4	4	40	60	100
	14 UZO 5M4	III	Major Based Elective -	Poultry Science	3	3	40	60	100
	14 UZO 5S3	IV	Skill Based Elective - II	Sericulture	2	2	40	60	100
	14 UZO 5EC3		Extra Credit-3	Water Pollution Management	-	4*	-	100*	100*
TOTAL					**30**	**29**	**320**	**480**	**800**
VI	14 UZO 6C12	III	Core XII	Biochemistry and Biophysics	5	4	40	60	100
	14 UZO 6C13	III	Core XIII	Immunology	5	4	40	60	100
	14 UZO 6C14	III	Core XIV	Economic Entomology	5	4	40	60	100
	14 UZO 6C15	III	Core XV	Evolution	4	4	40	60	100
	14 UZO 6C16	III	Core XVI	Environmental Biology	4	4	40	60	100
	14 UZO 6C17P	III	Core XVII	Biochemistry and Biophysics, Immunology, Economic Entomology, Evolution, Environmental Biol Practical	4	4	40	60	100
	14 UZO 6S4	IV	Skill Based Elective - IV	Dairy Farming	2	2	40	60	100
	14 U CN6GS	V	Gender Studies	Gender Studies	1	1	40	60	100
	14 UZO 6EC4		Extra Credit-4	Comprehensive Examinations in Zoology	-	4*	-	100*	100*
TOTAL					**30**	**27**	**320**	**480**	**800**
GRAND TOTAL					**180**	**140**	**1680**	**2520**	**4200**

* Not Considered for Grand Total and CGPA; # Non-Major Elective; II Semester NME - I Vermiculture Technology; III Semester NME - II Health Education

Allied Zoology (2014-2015)

Sem	Subject Code	Part	Course	Subject Title	HRS/ Week	Credit	Int. Mark	Ext. Mark	Mark
III	14 UZO 3A3	III	Allied III	Animal structure and function	6	3	40	60	100
	14 UZO 3A3 P	III	Allied III P	Invertebrates and Chordates Practical	2	2	20	30	50
IV	14 UZO 4A4	III	Allied IV	Commercial Zoology	5	3	40	60	100
	14 UZO 4A4 P	III	Allied IV P	Animal Physiology and Commercial Zoology Practical	2	2	20	30	50

B.Sc., (Zoology)
Semester I: CORE I

BIOLOGY OF INVERTEBRATES

Sub Code: 14UZO1C1
Hours/Week: 4
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:

To highlight the importance of invertebrate taxonomy and to understand the fundamental organization, adaptations and significance of invertebrate animals.

Unit: I PROTOZOA & PORIFERA **12 Hours**

Taxonomic characters – Level of organization – Symmetry – Coelom.
General characters and outline classification upto classes with examples.
Type study: *Paramecium*
General topics: Protozoan diseases in man. # Canal system in sponges #

Unit: II COELENTERATA **12 Hours**

General characters and outline classification upto classes with examples.
Type study: *Obelia*
General topics: Polymorphism in Coelenterata . # Coral reefs #

Unit: III PLATY HELMINTHES AND ANNELIDA **12 Hours**

General characters and outline classification upto classes with examples.
Type study: *Liver fluke and Earthworm*
General topics: Adaptations of helminthes to parasitic life, # Metamerism in annelids #.

Unit: IV ARTHROPODA **12 Hours**

General characters and outline classification upto classes with examples.
Type study: Cockroach
General topics: # Crustacean larvae #. Mouth parts of Insects.

Unit: V MOLLUSCA & ECHINODERMATA **12 Hours**

General characters and outline classification upto classes with examples.
Type study: Freshwater mussel.
General topics: Water vascular system. # Economic importance of Molluscs #

Dr.S.M.MAZHAR NAZEEB KHAN
M.Sc.,M.Phil.,Dip.in Arabic.,M.B.A.,Ph.D.,
Controller of Examinations
Jamal Mohamed College
(Autonomous)
Tiruchirappalli-620 020.

Text Book:

Jordan, E.L. and P.S.Verma. Invertebrate Zoology, S.Chand & Co. 2007.

Books for Reference:

1. Kotpal, R.L. Invertebrata, Rastogi Publication, Meerut. 2000.
2. Ekambaranatha Ayyar, Outlines of Zoology. Vols. I & II S.Viswanathan (Printers & Publishers) Pvt. Ltd., Chennai. 1993.

2. VermaTyagi and Agarwal , Animal Physiology.S.Chand and Co. Delhi. 1997.

SELF STUDY

1. Canal system in sponges
2. Coral reefs
3. Metamerism in annelids
4. Crustacean larvae
5. Economic importance of Molluscs

B.Sc., (Zoology)- Practical - I
Semester I: CORE I P

BIOLOGY OF INVERTEBRATES - PRACTICAL

Sub Code: 11UZO1M1 P
Hours/Week: 2
Credits: 2

Max Marks: 100
Internal Marks: 40
External Marks: 60

Dissections:

Cockroach: Digestive system, Nervous system and Reproductive system.
Earthworm: Nervous system

Mountings:

Earthworm - Body setae & Penial setae
Mouthparts of Mosquito, Housefly, Honey bee and Cockroach

Spotters:

Entamoeba, Paramecium, Euglena, Sycon, Hydra, Aurelia, Sea anemone, *Ephyra* larva, *Physalia, Planaria, Fasciola hepatica, Taenia solium, Ascaris, Nereis, Leech,* Trochophore larva, *Peripatus,* Prawn - Nauplius, Crab, Spider, Butterfly, Rhinoceros beetle, Pila, Freshwater mussel, *Octopus, Chiton, Dentalium*, Sepia, Starfish, Sea urchin and Sea cucumber.

Record Note

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

B.Sc., (Zoology)
SEMESTER II: CORE II

BIOLOGY OF CHORDATES

Sub Code: 14 UZO 2C2
Hours/Week: 4
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

OBJECTIVES:
To provide a basic knowledge on the fundamental organization of selected chordate animals

UNIT I PROCHORDATES **12 Hours**
Class: General characters and classification upto subclasses with examples.
Type study: Amphioxus.
General topics: External features and biological significance of Ascidian and Balanoglassus, #Parental care in Amphibia#.

UNIT II PISCES AND AMPHIBIA **12 Hours**
Class: General characters and classification upto subclasses with examples.
Type study: Scoliodon.
General topics: #Fish migration#.

UNIT III REPTILIA **12 Hours**
Class: General characters and classification upto subclasses with examples.
Type study: Calotes.
General topics: #Poisonous and non-poisonous snakes of south India#; Identification, Biting mechanism; Nature of poison and treatment.

UNIT IV AVES **12 Hours**
Class: General characters and classification upto subclasses with examples.
Type study: Columba livia – External characters, Exoskeleton, Flight muscles, #Respiratory system#.
General topics: Flight adaptation in birds.

UNIT V MAMMALIA **12 Hours**
Class: General characters and classification upto subclasses with examples.
Type study: Rabbit – Morphology – Buccal cavity, Dentition – Digestive system – Respiratory system – Structure of heart, Structure of brain – Urinogenital system.
General topics: #Adaptations of Aquatic Mammals#.

15/1/15

Dr.S.M.MAZHAR NAZEEB KHAN
M.Sc.,M.Phil.,Dip in Arabic.,M.B.A.,Ph.D.,
Controller of Examinations
Jamal Mohamed College
(Autonomous)
Tiruchirappalli-620 020.

TEXT BOOKS

1. Ekambaranatha Ayyar M and Ananthakrishnan T N, Manual of Zoology Chordates Vol II S,Viswanathan Publisers (2003)

UNIT I	Chapter 1 – 4	T.B- 1
UNIT II	Chapter 5-7	T.B- 1
UNIT III	Chapter 8	T.B- 1
UNIT IV	Chapter 9	T.B- 1
UNIT V	Chapter 10, 12	T.B. 1

REFERENCE BOOKS

1. E.L. Jordan, and P.S.Verma , Chordate Zoology, S.Chand & Co. (2007).
2. Kotpal R L Modern text book of Vertebrates. Rastogi Publications (2007)
3. Young J. Z Life of Vertebrates. ,Oxford University Press, USA; 3 edition (1991)

SELF STUDY

1. Parental care in Amphibia
2. Fish migration
3. Poisonous and non-poisonous snakes of south India
4. Respiratory system
5. Adaptations of Aquatic Mammals

B.Sc., (Zoology)
Semester II: CORE II P

PRACTICAL –II BIOLOGY OF CHORDATES - PRACTICAL

Sub Code: 14 UZO 2M2P
Hours/Week: 3
Credits: 3

Max Marks: 100
Internal Marks: 40
External Marks: 60

DISSECTIONS

Virtual laboratory technique: Video clippings of Arterial system, Venous system, Digestive system and Reproductive system of Frog /(Fish, Birds).

Demonstration Dissection: Digestive system of Fish.

MOUNTING

Scales of Shark, Teleost Fish (Ctenoid, Cycloid types) , Gill of fish, Fins of fish, Feathers (Ultra structure)

SPOTTERS

Amphioxus, Balanoglossus, Ascidian, Anabas, Eel, Exocetus, Echenis, Ichthyophis, Rhacophorus, Ambystoma,Chameleon, Hemidactylus, Viper, Cobra, Duck, Owl, Eagle, Loris, Bat..

Record Note

* A record of lab work should be maintained and submitted at the time of Practical Examination for valuation.

B. Sc., (Zoology)
Semester II : NME-I

VERMICULTURE TECHNOLOGY

Sub Code: 14UZO2N1
Hours/Week: 2
Credits: 2

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objectives:

To enhance a detailed knowledge on vermiculture technology and to highlight the benefits of ecofriendly agriculture by way of organic farming utilizing the biproducts of vermiculture.

Unit: I **6 Hours**

Need for Vermiculture – # Earthworm Taxonomy # – Morphology, Anatomy and Physiology of earthworms.

Unit: II **6 Hours**

Types of Vermicomposting – Role of earthworms in composting – # Vermicast #. Vermitechnology and its applications – Physical, Chemical and Biological properties of Vermicompost.

Unit: III **6 Hours**

Raw materials and requirements of vermicomposting - Maintenance of composting - # Collection of vermicompost # – Efficiency of vermicompost – General problems in production of vermicompost.

Unit: IV **6 Hours**

Advantage of vermicompost – Vermi – composting of Agricultural and Urban Solid Wastes – Recycling of wastes through vermicomposting – # Earthworms as bioreactors #.

Unit: V **6 Hours**

Small Scale or Indoor vermicomposting – Large scale or outdoor vermicomposting. # Effects of vermicompost on soil properties #.
Vermicompost – Quality & Economics. Prospect of vermiculture as a self employment venture.

Dr.S.M.MAZHAR NAZEEB KHAN
M.Sc.,M.Phil.,Dip.in Arabic.,M.B.A.,Ph.D.,
Controller of Examinations
Jamal Mohamed College
(Autonomous)
Tiruchirappalli-620 020.

15/11/15

Text Books:

T.B.1. Sultan Ahmed Ismail. The Earthworm, Others India Press, Mapura 403507, Goa, India. 2005.

T.B. 2. Seethalashmy. A text book of Vermitechnology, Saras Publications. 2012.

Book for Reference:

1. Edwards, C.A. and Loft, J.R. Biology of Earthworms, 3rd Edition, Chapman Publications. 1977.
2. NIIR Board, The complete Technology Book on Vermiculture and Vermicompost. 2006.

SELF STUDY

1. Earthworm taxonomy
2. Vermicast
3. Collection of vermicompost
4. Earthworms as bioreactors
5. Effects of vermicompost on soil properties

Semester III: Allied Course III
(For B.Sc., Botany)

ANIMAL STURCTURE AND FUNCTION

Sub Code: 14UZO 3A3
Hours/Week: 6
Credits: 3

Max Marks:100
Internal Marks: 40
External Marks: 60

Objective:

To study the basic principles of animal physiology, physical and chemical properties of living matter. Also to understand the physiology of various organs and organ systems, and to learn about the hormonal regulations and their defects in Man.

Unit: I **18 Hours**

Classification of Invertebrates upto phyla with diagnostic features and examples. Cockroach: External morphology, mouth parts, # Digestive system #, respiratory system, circulatory system, nervous system and reproductive system.

Unit: II **18 Hours**

General characters of Chordates - classification of Vertebrata upto classes with suitable examples. Frog – External features, digestive system, respiratory system, circulatory system, # Nervous system and urino-genital system #.

Unit: III **18 Hours**

Physiology of digestion and absorption, respiration, transport of oxygen and carbon-dioxide, structure of kidney and nephron, # Urine formation #..... IN MAN.

Unit: IV **18Hours**

Structure, # Composition and functions of blood of man #, types of muscle, structure of neuron, nerve impulse conduction - physiology of vision in man.

Unit: V **18 Hours**

Structure and functions of Pituitary, Islets of Langerhans, # Human Reproductive Systems # – Menstrual cycle.

Dr.S.M.MAZHAR NAZEEB KHAN
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TEXT BOOK:

1.Leelavathy, S. Nair Revised Enlarged Edition, A Text book of Invertebrates, - Saras Publications. 2001.

REFERENCE:

1. Ekambaranatha Ayyar, Outlines of Zoology.Vol. I S.Viswanathan (Printers & Publishers) Pvt. Ltd., Chennai, 1993.

2. Verma Tyagi and Agarwal , Animal Physiology.S.Chand and Co. Delhi. 1997.

SELF STUDY

1. Digestive system
2. Nervous system and urino-genital system
3. Urine formation in man
4. Composition and functions of blood of man
5. Human reproductive systems

Dr. S. M. MAZHAR KHAN
M.Sc., M.Phil., Dip.in Arab... , Ph.D.,
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B.Sc., (Botany)
Semester III: Allied Course III P(B.Sc., Zoology)

INVERTEBRATA & CHORDATA PRACTICAL

Sub Code: 14UZO 3A3 P
Hours/Week:2
Credits: 2

Max Marks:50
Internal Marks: 20
External Marks: 30

DISSECTION:

Cockroach: Mouthparts, Digestive and Nervous systems.

Frog – Pro-dissector software: Digestive , Arterial and Venous systems.

Preparation of Blood Smear and Observation of RBC and WBC.

Blood Grouping.

SPOTTERS:

Paramecium, Obelia, Aurelia, Ephyra larva, *Fasciola hepatica, Taenia solium, Nereis,* Ascaris male and female, Earthworm, Prawn, Butterfly, Freshwater Mussel, Starfish.
Shark, Frog, Snake, Pigeon, Rabbit.

B. Sc., (Zoology)
Semester III: CORE III

CELL AND MOLECULAR BIOLOGY

Sub Code: 14UZO3C3
Hours/Week: 4
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objectives:
To elucidate the structure and function of cell organelles and to ~~desire~~ describe genome organization and regulatory control.

UNIT I: **12 Hours**
Cell: Ultra structure and its components, #Plasma membrane#: Ultra structure models and functions.
Cytoplasm: Components and functions. Interactions between cells and their environment.

UNIT II: **12 Hours**
Structure and functions of Golgi complex, # Endoplasmic reticulum #, Mitochondria, Ribosome and Lysosome.

UNIT III: **12 Hours**
Structure and functions of Nucleus, Nucleolus and Chromosomes. Cell Cycle- Cell division - # Mitosis and Meiosis #.

UNIT IV: **12 Hours**
Nucleic acids: Structure and functions of DNA, RNA. DNA replication. Protein synthesis: Transcription and Translation. # Cell signaling #.

UNIT V: **12 Hours**
Cancer cell: # Olicogenes # – Characteristics and types. Apoptosis cancer treatment and prevention.

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Text Books:

T.B.1. De Robertis, E.D.P. and De Robertis, E.M.F. Cell and Molecular Biology, VIII Ed., Lea and Febiger, Philadelphia. 1987.

T.B.2. Verma, P.S and Agarwal V.K.Concepts of Molecular Biology, Chand & Company Ltd., New Delhi. 2009.

Books for Reference:

1. Gupta, P.K. A text book of Cell and Molecular Biology, Rastogi Publications, Meerut. 1999.
2. Powar, C.B. Essentials of Cytology, Himalayan Publishing House, New Delhi. 1997.

SELF STUDY

1. Plasma membrane
2. Endoplasmic reticulum
3. Mitosis and Meiosis
4. Cell signaling
5. Olicogenes

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B.Sc., (Zoology) - Practical
Semester III : CORE III P

CELL AND MOLECULAR BIOLOGY – Practical

Sub Code: 11 UZO3M3 P
Hours/Week: 3
Credits: 3

Max Marks: 100
Internal Marks: 40
External Marks: 60

1. Study of Compound microscope: Setting and Handling Procedure.
2. Micrometric measurement of cell
3. Squash preparation of Onion root tip for study of mitotic stages.
4. Squash preparation of grasshopper testis for meiotic stages.
5. Smear preparation of human blood for RBC and WBC stydies.
6. Squash preparation of Salivary gland of Chironomous larva for Polytene Chromosome studies.
7. Models of DNA, tRNA and DNA replication
8. Spotters: Epithelial, Muscular, Vascular tissues.

Record Note

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

B.Sc., (Zoology)
Semester III : NME II

Health Education

Sub Code: 14UZO3N2
Hours/Week: 2
Credits: 2

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:

To impart awareness on Public Health and Hygiene and to create knowledge on Health Education.

Unit: I **6 Hours**

Health: Definition – dimensions of health. Health education: Definition – objectives – principles. # Nutrition and health #: Balanced diet – Food hygiene. Life style diseases

Unit: II **6 Hours**

Environment & Health: Water, Air and Noise pollution. Pollutants: Effects, prevention and control. # Effects of smoking and alcoholism #.

Unit: III **6 Hours**

Concept of disease: Phases of disease – # Prepathogenesis and Pathogenesis # – concept of prevention and control – Common Helminthes and Arthropod borne diseases .

Unit: IV **6Hours**

communicable diseases: Classification – # Agents and factors # - Mode of transmission – Symptoms and treatment of Tuberculosis, Typhoid, Hepatitis A & B and AIDS -
Family planning: Definition – scope – contraceptive devices

Unit: V **6 Hours**

Mental Health: Definition - characteristics – causes and prevention of mental health - Occupational health & hazards – prevention. # Health care services – Primary health care # – Hospitals –Principles of First Aid for Accidents, Heart attack and Smoke life.

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M.Sc.,M.Phil.,Dip.in Arabic.,M.B.A.,Ph.D.,
Controller of Examinations
Jamal Mohamed College
(Autonomous)
Tiruchirappalli-620 020.

Text Books:

1.E. Park & Park: Textbook of Preventive and Social Medicine (Published by BanarsidosBhanot, 1278 NapierTown.)

Reference:

1. Leelavathy. S. Nair, Revised enlarged edition. A Text book of Invertebrates, Saras Publications. 2001

SELF STUDY

1. Nutrition and health
2. Effects of smoking and alcoholism
3. Prepathogenesis and Pathogenesis
4. Agents and factors
5. Health care services – Primary health care

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IV

Semester III Allied Course IV
(For B.Sc., Botany)

COMMERCIAL ZOOLOGY

Sub Code: 14UZO 4A4
Hours/Week:5
Credits: 3

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:

To disseminate information on economic aspects of Zoology and thereby motivate for self employment.

Unit: I **15 Hours**

Vermiculture: Species of Earthworms – Life cycle of *Lampito mauritii* – Preparation of Vermicompost – # Economic importance #.

Unit: II **15 Hours**

Apiculture: Species of Honey Bees – Types of bee hives –Extraction of honey – Nutritive and medicinal value of honey.

Lac culture: Life cycle of Lac insect – Extraction of Lac – # Economic importance of Lac #.

Unit: III **15 Hours**

Sericulture: Life cycle of *Bombyx mori*. Rearing of silk worm: Paraffin paper rearing – Box rearing – New net method – Co-operative methods. Diseases of silk worm : Protozoan – Bacterial - Viral diseases (each two) - Reeling of silk – # Economic importance of sericulture #.

Unit: IV **15Hours**

Aquaculture: Freshwater fishes – Construction of pond – Fish feed – Induced breeding – Fish diseases: Furunculosis, Epizootic Ulcerative Syndrome (EUS) and Vibriosis – Fresh water Prawn culture.-# Ornamental fish culture #.

Unit: V **15 Hours**

Poultry farming: Types of fowls – Rearing methods of Broilers and Layers –# Poultry nutrition # – Poultry diseases (NCD, IBV & Fowls).

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TEXT BOOK:

1. Ganga.G and Sulochana Chetty. J., An introduction to Sericulture(2nd edition) Oxford & IBH Publishing company.

REFERENCE:

1. Shukla.G.S. andUpadhya.V.B. Economic Zoology (Rastogi publications).
2. Ahsan, J and Sinha, S.P. A handbook on economic zoology, S.Chand& Co.
3. Sardersingh – Beeking in India.
4. Santhanam – Aquaculture.
5. Ullal.S.R. andNarasimhanna, M.N – Central Silk Board, Govt. of India, Bombay.
6. Singh – Livestock and poultry production.
7. Jhingran – Fish and fisheries.
8. T.V.R. Pillai – Coastal Aquaculture.
9. Maine product export development authority – Freshwater fishes, Ornamental fishes, Shrimph culture – MPEDA Publication series.

SELF STUDY:

1. Economic importance
2. Economic importance of Lac
3. Economic importance of sericulture
4. Ornamental fish culture
5. Poultry nutrition

B.Sc. (Allied Zoology) Practical – II
(For B.Sc. Botany)
Semester III: CORE IVP

ANIMAL PHYSIOLOGY AND COMMERCIAL ZOOLOGY PRACTICAL

Sub Code: 14UZO 4A4 P
Hours/Week: 2
Credits: 2

Max Marks: 100
Internal Marks: 40
External Marks: 60

Experiments:

1. Effect of Temperature on Salivary Amylase activity.
2. Observation of Human Blood Smear : RBC & WBC
3. Qualitative estimation of excretory products : Ammonia, Urea and Uricacid.

Spotters

Species of animals used in Vermiculture- *Lampito mauritii*, *Perionyx excavatus* Apiculture – *Apis indica* ;Sericulture – *Bombyx mori* ; Aquaculture – Major carps : Catla, Rohu and Mrigal: Prawn : Macrobrachium: Poultry : Layers & Broilers.

Animal products: Honey, Bee wax, Lac, Silk, and Hen's egg.

Record Work

A record of lab work should be maintained and submitted at the time of Practical Examination for valuation.

B.Sc., (Zoology)
Semester IV: CORE IV

ANIMAL PHYSIOLOGY

Sub Code: 14UZO4C4
Hours/Week: 4
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objectives:

To promote an integrated approach to the study of the functional aspects of various organs and organ systems of animals.

UNIT: I NUTRITION AND DIGESTION **15Hrs**

Nutrition: Balanced Died – BMR – BMI – Carbohydrate, Protein and Lipids – Intracellular and Intercellular digestion – # Role of enzyme in digestion # – Absorption of digested food materials - Malnutrition

UNIT: II RESPIRATION AND CIRCULATION **15Hrs**

Types of respiratory organs – Respiratory Pigments – Transport and Exchange of Gases – Anearobiosis and respiratory quotient. Blood: Composition and Function – Coagulation – # Structure and function of Human Heart # – ECG and Blood Pressure.

UNIT: III EXCRETION AND HOMEOSTASIS **15Hrs**

Excretion: Structure and function of Nephron – Urine formation in man – Ornithine cycle – Dialysis – Origin and types of Nitrogenous wastes – Ammonotelism – Uricotelism – # Osmoregulation in Crustaceans and fishes # – Thermoregulation – Mechanism – Ectotherms and Heterotherms.

UNIT: IV MUSCLE, NERVE AND CHEMICAL CO- ORDINATION **15Hrs**

Types of muscle – Ultra structure of skeletal muscle – # Mechanism of muscle contraction #. Structure and types of Neurons, Nerve impulse – Conduction of impulse through nerve – Myoneural junction – Reflex action. Receptors: Photo & Phono receptors.

UNIT: V ENDOCRINE AND BEHAVIOUR PHYSIOLOGY **15Hrs**

Endocrine glands: Structure and function of Pituitary, thyroid, adrenal islets of langerhans – Deficiency diseases. Menstrual and estrous cycle: The role of hormones in reproduction, menopause, pregnancy, Parturition. Behavior – Types – Learning and learned behavior. Chronobiology: Biological clock and Rhythms. Bioluminescence: Types – # Biochemistry and Significance #.

Text book:

1. Singh, H. R. Animal physiology and related biochemistry. SHOBAN Lal Nagin Chand and co., Educational Publishers, New Delhi.
2. A.Mria kuttikan, N.Arumugam. Saras publication, Animal phisiology. 2004,

Chapter

Unit I : Chapter-4
Unit II : Chapter-6& 8
Unit III : Chapter-13&15
Unit IV : Chapter-12&18
Unit V : Chapter- 21

Reference Books:

1. Rastogi, S. C. Essentials of Animal physiology. Wiley Eastern Limited. New Delhi. 1979.
2. Berry A. K. A text book of Animal physiology. Emkay publications. 1998.
3. Hoar,S.W. General and comparative physiology. Prentice Hall. 1987.
4. Parameswaran R., Anantha Krishnan, T. N. Anantha Subramanian. Outlines of Animal physiology K. S. Viswanathan PVT Ltd. Chennai.

SELF STUDY

1. Role of enzyme in digestion
2. Structure and function of Human Heart
3. Osmoregulation in Crustaceans and fishes
4. Mechanism of muscle contraction
5. Biochemistry and Significance

Dr.S.M.MA[illegible]AZEEB KHAN
M.Sc.,M.Phil.,[illegible]Arabic.,M.B.A.,Ph.D.,
Controller of Examinations
Jamal Mohamed College
(Autonomous)
Tiruchirappalli-620 020.

B.Sc., (Zoology) - Practical
Semester IV: CORE V P

ANIMAL PHYSIOLOGY- Practical

Sub Code: 14UZO 4C5P
Hours/Week: 4
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

ANIMAL PHYSIOLOGY

1. Human Salivary Amylase activity in relation to Temperature and pH
2. Effects of Temperature on the ciliary activity of Freshwater Mussel and calculation of Q_{10}
3. Identification of Nitrogenous Waste Products.
4. Total count of RBC and WBC & Differential count of WBC.
5. Quantitative tests for Carbohydrates, Proteins, and Lipids.
6. Simple test for Sugar, Albumin, and Urea in Human Urine.
7. Estimation of Haemoglobin.

SPOTTERS

Haemoglobinometer, Haemocytometer, Model of Aminoacids.

RECORD NOTE

* A record of lab work should be maintained and submitted at the time of Practical Examination for valuation.

B.Sc., (Zoology)
Semester IV: SBE II

AQUACULTURE

Sub Code: 14UZO4S2
Hours/Week: 2
Credits: 2

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objectives

To acquire basic knowledge on fish farm construction and management with special emphasis to freshwater fishes.

Unit-I FISH FARM CONSTRUCTION AND MANAGEMENT **6Hrs**

Scope of Aquaculture- Indian Aquaculture scenario. Freshwater aquaculture: Site selection –Pond construction - #Soil and Water management#.

Unit-II CULTURE OF FIN FISHES **6Hrs**

Culture organisms – Culture systems – Culture characteristics of commercially important freshwater fishes – Culture of Catla & Rohu. #Integrated fish culture#.

Unit-III CULTURE OF SHELL FISHES **6Hrs**

Taxonomic characters, food & feeding habits and culture methods of Pearl Oyster –# Freswater prawn culture# (Macrobrachium sp.).

Unit-IV SUPPLEMENTRY FEED& LIVE FEED CULTURE **6Hrs**

Fish feed – Nutritional requirements of fish – FCR – #Fish feed formulation & Preparation#; Live feed: Cyclops and Rotifer culture.

Unit-V DISEASE CONTROL: HARVESTING & POST HARVEST TECHNIQUES **6Hrs**

Fish diseases: Parasitic, Protozoan, Bacterial & Fungal . Fish harvesting: Crafts & Gears. #Transport & Marketing of fishes#.

Text book:

1. Arumugam, N. Aquaculture – Saras Publication; Nagercoil. ISBN-81-89941-31-4. 2008.

Unit I : Chapter-1,2&5
Unit II : Chapter-6, 10&14
Unit III : Chapter-18 & 20
Unit IV : Chapter-25 & 26
Unit V : Chapter- 27,30 & 31

References:

1. Agarwal, S.C. A hand book of fish farming . Narendra Publishing House, New Delhi. 1994.
2. Chakrabarthi, M.N. Biology, Culture and Production of Indian major carps, Narendra Publishing House, New Delhi. 1998.
3. Hall, C.B. Ponds and fish culture . Agrobotanical Publishers India. 1999.
4. Jhingran,V.G. Fish and fisheries of India , Hindustan Publishing Co., New Delhi. 1997.
5. Santhanam,R..Fisheris Science: Daya publication House.New Delhi. 1990.
6. TVR. Pillay – Aquaculture: Principle & Practices.

SELF STUDY

1. Soil and Water management
2. Integrated fish culture
3. Freswater prawn culture
4. Fish feed formulation & Preparation
5. Transport & Marketing of fishes

Dr.S.M.MAZHAR NAZEEB KHAN
M.Sc.,M.Phil.,Dip.in Arabic.,M.B.A.,Ph.D.,
Controller of Examinations
Jamal Mohamed College
(Autonomous)
Tiruchirappalli-620 020.

B.Sc., (Zoology)
Semester IV: Extra Credit I

NATURAL RESOURCES MANAGEMENT

Sub Code: 14UZO 4EC1
Hours/Week: -
Credits: 4

Max Marks: 100
Internal Marks: -40
External Marks: 60

Objectives

To create fundamental understanding of ecology and to impart knowledge on natural resources and sustainability, by protecting and enhancing the quality of environment.

Unit: I **15 Hours**

Natural Resource Ecology: Concept and Classification of resources, Non-Renewable and Renewable resources, Conservation and Resource management.

Water Resources: Water and its Importance, Status of India's Water Resources, Conservation Water Resource, Rainwater Harvesting, # Environmental Impact of Dams and Reservoirs #.

Unit: II **15 Hours**

Forest Resources: Importance – Classification. Structure and Kinds of forests. Availability of Forest Cover over the World and India, Deforestation and Its Environmental Impacts, #Conservation and Sustainable Management of Forests#

Unit: III **15 Hours**

Soil and Land Resources: Definition & Importance soil, Degradation and Soil Erosion. Soil resource of India and the extent of Soil Degradation, #Conservation of soil and Its protection from water and wind Erosion #

Unit: IV **15 Hours**

Food Resources: Types of Food resources, Food problems of the World, #Impact of Traditional and Modern Agriculture#. Ecosystem changes due to over grazing by live-stock, Impact of over fishing.

Unit: V **15 Hours**

Mineral Resources: Definition - Classification of Minerals, availability of Fossil Fuels and important minerals in the World and the India. Necessity of conserving Mineral resources,# Environmental Impact of Mining activities#

Dr.S.M.MAZHAR NAZEEB KHAN
M.Sc.,M.Phil.,Dip.in Arabic.,M.B.A.,Ph.D.,
Controller of Examinations
Jamal Mohamed College
(Autonomous)
Tiruchirappalli-620 020.

Text Books:

1. Madhab Chandra Dash & Satya Prakash Dash,Fundamentals of Ecology,Third Edition, Tata McGraw Hill Education Private Limted , 2009.

2. Santhosh Kumar Garg, RajeswariGarg & Dr. RanjaniGarg, Ecology and Environment Studies, Khanna Publishers, 2006.

Unit I: Chapter 4 (4.8-4.15) T.B.2
Unit II: Chapter 7T.B.-1, Chapter 4 (4.1-4.7) T.B.2
Unit III Chapter 4(4.16-4.19) T.B.2
Unit IV Chapter 4(4.20-4.24) T.B.2
Unit V Chapter 4(4.25-4.30) T.B.2

Books for Reference:

1. Salvati L and Marco Z . Natural resource depletion and economic performance of local districts: suggestions from a whithin-country analysis Journal of Sustainable Development and World Ecology. 15(6): 518–523. 2008.
2. Theodore Roosevelt, Address to the Deep Waterway Convention Memphis, TN, October 4, 1907
3. UNESCO and UNEP, Cultural Diversity and Biodiversity for Sustainable. 2002. Development, World Summit on Sustainable Development, Johannesburg.
4. Nellemann C and Corcoran E .Dead Planet, Living Planet- Biodiversity and Ecosystem Restoration for Sustainable Development: A Rapid Response Assessment. United Nations Environment Program, GRID-Arendal. 2010.
5. Von Braun J cited in Inforesources Trends Depletion of Natural Resources – Implications for Development: An assessment by experts Berne, Switzerland. 2005.

SELF STUDY

1. Environmental Impact of Dams and Reservoirs
2. Conservation and Sustainable Management of Forests
3. Conservation of soil and Its Protection from Water and Wind Erosion
4. Impact of Traditional and Modern Agriculture
5. Environmental Impact of Mining activities

B.Sc., (Zoology)
Semester IV: Extra Credit II

Wild Life Biology

Sub Code: 14 UZO 4EC2
Hours/Week:
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:

To enlighten the importance of Wild Life and their habitat conservatio.

Unit: I **15 Hours**

Definition of Wildlife – Causes of Wildlife depletion –# Need for Wildlife conservation # – IUCN categories – Endangered species of Mammals in India.

Unit: II **15 Hours**

Wildlife Sanctuaries - National parks – Definition and importance – Vedanthangal bird sanctuary, Mudumalai sanctuary, Anamalai sanctuary; National parks – # Guindy Deer park # – Corbett National park.

Unit: III **15 Hours**

Wildlife census techniques – Direct method: Line Transect method ; Block count method. Indirect method : # Pellet analysis method # – Pug mark techniques.

Unit: IV **15 Hours**

Zoos and their importance – Types of enclosures – Food and feeding of Zoo animals – # Importance of Zoo Education #.

Unit: V **15 Hours**

Wildlife Protection Act 1972 : Introduction - Schedules – Declaration of Wildlife Sanctuaries and National parks,- # Significance of NGO's in Wildlife Conservation #.

Dr.S.M.MAZHAR NAZEEB KHAN
M.Sc.,M.Phil.,Dip.in Arabic.,M.B.A.,Ph.D.,
Controller of Examinations
Jamal Mohamed College
(Autonomous)
Tiruchirappalli-620 020.

Text Books:

1. Saharia, V.B. Wildlife in India. Nataraj Publications, Dehradun. 1982.

Unit I Chapter 1 T.B.1
Unit II Chapter 2 T.B.1
Unit III Chapter 5 T.B.1
Unit IV Chapter 7,3T.B.1
Unit V Chapter 9 T.B.1

Books for Reference:

1. Giles, R. H. Jr (Ed). Wildlife Management Techniques. The Wildlife Society, Washington, D.C. Nataraj Publishers, Dehradun, India. 1984.

2. Seshadri, B. India's Wildlife reserves, Sterling publishers, New Delhi. 1986.

SELF STUDY

1. Need for wildlife conservation
2. Guindy deer park
3. Pellet analysis method
4. Importance of Zoo education
5. Significance of NGO's in Wildlife Conservation

B.Sc., (Zoology)
Semester V: CORE VI

BIOSTATISTICS, COMPUTER APPLICATION AND BIOINFORMATICS

Sub Code: 14UZO5C6
Hours/Week: 4
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:

To acquire basic knowledge in biostatistics and bioinformatics; and to understand the importance of computers as biostatistical tools.

Unit: I **12Hours**

Data Collection – Sources of primary and secondary data –Collection and Tabulation of data. Diagrammatic & Graphical representation of data - # Bar diagram # – Histogram - Frequency Polygon - Scatter diagram.

Unit: II **12Hours**

Sample and Sampling Methods: Mean – Median – Mode - Standard Deviation - Standard Error –# Test of significance # - Student t'test.

Unit: III **12Hours**

Generations of Computers - Classification – Characters – Application of Computers. Types of Software and Hardware. Computer languages: Low level languages – Operating system –# Basic concept of Internet #.

Unit: IV **12Hours**

Bioinformatics: Definition – History – Scope – Importance – # Compononents of Bioinformatics # - Biological data bases – Sequence - Primary database – Secondary database.

Unit: V **12Hours**

Bioinformatics tools - Classification of Fasta – Rasmol – Phylogenetic analysis and Tree formation – # Structure and interpretation #.

Text Books

1. Rastogi, V.B. Fundamentals of Biostatistics. Ane's books ltd., New Delhi. 2006.
2. Ram, B. Computer fundamentals – Architecture and organization – Wiley Eastern Ltd. New Delhi. 1995.
3. Subramanian.C. A textbook of Bioinformatics. Dominant Publishers and distributions, NewDelhi, India. 2004.

Reference

1. Arora, P.N. Biostatistics , Himalaya Publishing House. 1998.
2. Ramakrishnan, P. Biostatistics , Saras Publications, Nagercoil. 1996.
3. Ravikant,T., PC Software made simple Tat McGraw Publishing Co Ltd. 1995.
4. V.Rajaraman. Fundaments of Computer Prentice Hall of India. 1985.
5. Murthy, C.S.V Bioinofrmatics Himalaya Publishing Horse, Mumbai, India. 2003.

SELF STUDY

1. Bar diagram
2. Test of significance
3. Basic concept of Internet#.
4. Compononents of Bioinformatics
5. Structure and interpretation

B.Sc., (Zoology)
Semester V: CORE VII

GENETICS

Sub Code: 14UZO5C7
Hours/Week: 4
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:

To discern the concept of gene, the role of genes in determining characters, the principles of inheritance and mechanism of heredity and variation.

UNIT - I **12Hrs**

Mendelian laws – Monohybrid and Dihybrid Experiments – Test cross and Back cross – # Linkage and Crossing over # – Multiple alleles – Blood group inheritance – ABO & Rh factors.

UNIT - II **12Hrs**

Mechanism of sex determination in man - Hormonal factors. # Sex linked inheritance # - Sex–limited and Sex influenced inheritance –Environmental determination of sex.

UNIT - III. **12Hrs**

Identification of DNA as genetic material – # Griffith experiment # – Stucture of Chromosome and Gene – Ciston – Recon, Muton. Mutation : Gene mutation – Chromosomal abervation – Euploidy, Polyploidy – Causes of mutation.

UNIT - IV. **12Hrs**

Recombination in Bacteria: Transformation, # Conjugation #, Transduction, Recombination in phages – Lytic and Lysogenic cycles-Genetic application of bacteria.

UNIT- V **12Hrs**

Human Genetics: Karyotype and Pedigree analysis – Syndromes: Turner, Klinefelters, and Downs. Inborn Errors of Metabolism and Disorders in Man: PKU, Alkaptonuria, Albinism, Thalassemia, Sickle cell anemia, # Effects of drugs on human heredity #.

Text book

1. Verma. P.S. and V.K.Agarwal. Genetics. S. Chand & Co., New Delhi. 1997.
2. Verma. P.S. and V.K.Agarwal. Concept of Genetics, Human Genetics and Eugenics. & . S. Chand & Company Ltd, New Delhi. 1998.

Chapter

Unit I : Chapter-2
Unit II : Chapter-10
Unit III : Chapter-22&27
Unit IV : Chapter-42
Unit V : Chapter- 40

Reference

1. Friefelder, D., Microbial Genetics. Narosa Publishing, New Delhi. 1997.
2. Goodenough, U. Genetics. Saunders College Publishing International, New York. 1997.
3. Lewin,B. Gene VI. Wiley Eastern Ltd., New Delhi. 1998.
4. Rothwell, N.V. Human Genetics. Prentice Hall of India, New Delhi. 1979.
5. Sinnott, E.W., L.C.Dunn and L.C.Dobzhansky, T. Principle of Genetics. Tata Mc.Graw Hill., New Delhi. 1985.
6. Gardner Principles of Genetics. Wiley Eastern, Pvt., Ltd. 1984.
7. Mitra, S. Genetics – a blue print of life. Tata McGraw Hill Pub. Co., Ltd., Delhi. 1994.
8. Dr.R.P.Megyan, Genetics, Saras publication, 114 /35. A.R.P.Camp road,Periavilar, Kottor (post). Nagerkoil. 2012.

SELF STUDY

1. Linkage and Crossing over
2. Sex linked inheritance
3. Griffith experiment
4. Conjugation

5. Effects of drugs on human heredity

B.Sc., (Zoology)
Semester V: CORE VIII

MICROBIOLOGY

Sub Code: 14UZO5C8
Hours/Week: 4
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:
To familiarize the fundamentals of microbes and their significance in Industry, Agriculture, Food and Human Health.

Unit: I INTRODUCTION AND CLASSIFICATION **12 Hours**

History and Scope- contribution of Louis Pasteur-Robert Koch-Alexander Fleming – Antonie Van Leeuwenhoek. Outline classification of microbes – Whittaker's five kingdom concept- Prokaryotes and Eukaryotes. # Theory of spontaneous generation #

Unit: II MICROBIAL CHARACTERISTICS **12 Hours**

Basic structure and salient features of : Virus, Bacteria, Fungi, Yeast and Algae.
Gram Staining: Gram negative and Positive bacteria. # Gram staining reagents and cell density #.

Unit: III MICROBIAL CULTURE **12 Hours**

Culture of Bacteria – Types of bacterial culture- Pure culture. Bacterial growth curve. Types of media-Nutritional requirements - Disinfection: physical and chemical agents of sterilization and filtration. # Culture and handling methods #.

Unit: IV INDUSTRIAL, AGRICULTURAL AND FOOD MICROBIOLOGY **12 Hours**

Industrially useful Microorganisms – Fermentation of Alcoholic beverage - Uses of microorganisms in Agriculture: Nitrogen fixers, Biofertilizers, Biopesticides, # Biocontrol agents #. Microorganisms as source of food: Dairy products, preservation of food, food spoilage, food poisoning.

Unit: V MEDICAL MICROBIOLOGY **12 Hours**

Microbial Diseases of Man – Bacterial disease : TB,Typhoid, Leprosy, # Syphilis and Tetanus #.
Viral disease: Influenza, Chicken pox, Hepatitis, Polio and AIDS.

Text Books:

1. Dubey R.C and Maheswari D.K. Text Book of Microbiology, S. Chand and Company Ltd, New Delhi. 2009.
2. Ananthanarayanan, R and Jayaram Panicker, C.K. Text Book of Microbiology, Orient Longman, Chennai and Hyderabad. 2000.

Reference:

1. Sharma,P.D., Microbiology , Rastogi Publications. 1998.
2. Pelczar, Chan and Krieg, Microbiology, Tata Mc Graw Hill Pub. Co. Ltd. 1993.

SELF STUDY

1. Theory of spontaneous generation
2. Gram staining reagents and cell density
3. Culture and handling methods
4. Biocontrol agents
5. Syphilis and Tetanus

B.Sc., (Zoology)
Semester V: CORE IX

DEVELOPMENTAL BIOLOGY

Sub Code: 14UZO5C9
Hours/Week: 4
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:

To understand the sequential changes from cellular organization to organ grade level of organization in the development of multi-cellular organisms, and to highlight the relevance of human embryology to modern fertility techniques.

Unit: I **12 Hours**

Gametogenesis: Historical concepts-Scope of Embryology. Gametogenesis: Spermatogenesis & Oogenesis. # Previtellogenesis # – Vitellogenesis - Egg membranes.

Unit: II **12 Hours**

Fertilization: Significance– Physical & Chemical factors involved - Cytological and Physiological changes-# Biochemistry of egg activation # – Parthenogenesis.

Unit: III **12 Hours**

Early Embryogenesis and Gastrulation: Types of eggs– Cleavage patterns & Laws – Physiological and biochemical changes - Role of egg cortex. Fate map – Gastrulation in Frog – Physiology of Gastrulation - Cell lineage - Organizer : Concepts and # Induction process #.

Unit: IV **12 Hours**

Organ formation; **Differentiation** & **Post Embryonic Development**: Organogenesis – Development of eye in chicks. Differentiation: Definition & Chemical basis. Placentaion in Mammals. Placenta types and classification. # Metamorphosis in Amphibians # – Regeneration.

Unit: V **12 Hours**

Implications of Developmental Biology: Medical implications: Infertility-Artificial Insemination – IVF – Embryo Transfer, ART Aminogentesis, # Somatic Animal cell fusion #, Cryopreservation, Birth control.

Text book:

1. Balinsky, W.B Saunders, Philadelphia, 3rd Edn., An Introduction to Embryology. 1981.

Unit I : Chapter-1-5
Unit II : Chapter-6& 7
Unit III : Chapter-8-10, 13&17
Unit IV : Chapter-14, 15, 18& 22
Unit V : Chapter- 23, 25-29, 33& 35

References

1. Huettner. Fundamentals of Comparative Embryology, Macmillan, New York. 1949.
2. Patten .Fundamentals of Embryology –Mc.Graw Hill Book Co., New York. 1961.
3. Arumugam,N. Developmental Zoology – Saras Publication; Nagercoil,.ISBN:978-81-89941-63-5. 2012.

SELF STUDY

1. Previtellogenesis
2. Biochemistry of egg activation
3. Induction process
4. Metamorphosis in Amphibians
5. Somatic Animal cell fusion

B.Sc., (Zoology)
SEMESTER V: CORE X

BIOTECHNOLOGY

Sub Code: 14 UZO 5C10
Hours/Week: 4
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:

To impart knowledge on Modern Biotechnology and the basics of Genetic Engineering and to correlate their applications in Industry and environmental protection.

Unit I **12 Hours**

Biotechnology: Definition, Scope and Importance – Biotechnology in Medicine, Agriculture, # Animal Husbandry and Environment #.

Unit II **12 Hours**

Genetic Engineering: Introduction, Methods involved- Tools used : Enzymes. Cloning Vectors. Transposons, Linkers and Adapters. Southern Blotting and Western Blotting - # Gene Library and Gene Bank #.

Unit III **12 Hours**

Genetic manipulation of Eukaryotes: Gene transfer methods in Yeast, Animals, Plants and their applications- # Agrobacterium as a natural genetic engineer and its applications #.

Unit IV **12 Hours**

Industrial Biotechnology: Fermentation: Principles, Process, Scale up and Downstream Processing -Fermenter design and Types of fermenters – # Production of Ethanol by fermentation #.

Unit V **12 Hours**

Enzyme Biotechnology: Enzymes- Source- Production in large scale- Extraction and purification- # Enzyme immobilization # - Applications.

TEXT BOOKS

1, R C Dubey, Text Book of Biotechnology, S.Chand & Company Ltd. 2006

UNIT I T.B- 1 Capter 1, 11,13, 23 and 25
UNIT II T.B- 1 Capter 2-6
UNIT III T.B- 1 Capter 6,7,11,
UNIT IV T.B- 1 Capter 16,17
UNIT V T.B- 1 Capter 22

REFERENCE BOOKS

1. I.J Higgins, Best, D.J. and Jones, J. Biotechnology – Principles and Applications. Blackwell Scientific Publications, Oxford, London, Edinburgh. 1988.
2. S. B Primrose. Modern Biotechnology. Blackwell Scientific Publications, Oxford, London. 1989.
3. Kumaresn, V.2009. Applied Animal Biotech. Saras Publication, Nagercoil.

SELF STUDY

1. Animal Husbandry and Environment
2. Gene Library and Gene Bank
3. Agrobacterium as a natural genetic engineer and its applications
4. Production of Ethanol by fermentation
5. Enzyme immobilization

B.Sc., (Zoology) - Practical
Semester V: CORE XI

BIOSTATISTICS, BIOINFORMATICS, COMPUTER APPLICATION, GENETICS, MICROBIOLOGY, DEVELOPMENTAL BIOLOGY AND BIOTECHNOLOGY – Practical

Sub Code: 14UZO 5C11P
Hours/Week: 4
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

BIOSTATISTICS, BIOINFORMATICS AND COMPUTER APPLICATION

Measure the length and weight of fish or any other animal, and calculate the mean and median values from leaves & shells

Retrieval of Gene Sequences from NCBI, preparation of FASTA data and examine the similarity percentage using Basic Local Alignment Searching Tool (BLAST)

Spotters: Input devices – mouse – keyboard – scanner. Output devices: monitor – printer – CPU

GENETICS

Mendelian traits in Man and calculation of gene frequencies
Drosophila: Culture & Genetic importantce
- Mutants
- Male and Female identification
- Humans Karyotypes & Pedigree analysis – Syndromes.

MICROBIOLOGY

Culture techniques- Enumeration of total heterotrophic bacterial count
Preparation of broth culture: Preparation of slants, Types of streaking
Gram Staining: +ve and –ve

Equipments in Microbiology

- Inoculation loop
- Autoclave
- Laminar flow hood
- Bacteriological incubator

DEVELOPMENTAL BIOLOGY

Examination of prepared microslides to study the following:
Frog: Egg – cleavage – blastula – yolk plug stage
Chick: Egg – 24hrs, 48hrs, 72 hrs

BIOTECHNOLOGY

Demonstration of agarose gel electrophoresis
Spotter : Models of PCR, Southern blotting, Vectors

OBSERVATION RECORD

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

B.Sc., (Zoology)
Semester V: MBE IV

POULTRY SCIENCE

Sub Code: 14UZO 5M4
Hours/Week: 3
Credits: 3

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objectives:

To provide knowledge on the fundamentals of poultry production and management.

Unit I INTRODUCTION **9 Hours**

Poultry industry in India - Poultry breeds and classes of fowls –Poultry housing – General principle of building poultry house – # Poultry equipments #.

Unit II CULTURE PRACTICE **9 Hours**

Rearing of fowls – Methods of rearing chicks, growers, # layers and broilers # – Growth and management of fowls in summer, and winter management.

Unit III POULTRY NUTRITION **9 Hours**

Poultry nutrition – Nutritional requirements of fowls – Composition of feed – Nutrition deficiency symptoms – # Non nutritive feed additives #.

Unit IV POULTRY PRODUCTS **9 Hours**

Poultry products – Composition and nutritive value of eggs – Poultry meat processing – Marketing of poultry products – # Poultry manure #.

Unit V DISEASE MANAGEMENT **9 Hours**

Poultry diseases - Viral Disease: Ranikhet disease and Fowl pox. Bacterial Disease: Salmonelloses and Fowl Cholera. Fungal Disease: # Aspergillosis and Aflatoxicosis #. Parasitic Diseases: Coccidiosis and Ticks.

Text books:

1. M.R. Gnaanamani .Poultry keeping, GIRI Publication, Madurai. 2003.

2. Shukla. Upadhya Economic Zoology. 2005.

Reference:

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

2. Intensive poultry management for egg production. Bulletin No. 152. Her Majestry's Stationary office London.
3. Nutrition of the chicken – M.L.Scott *et al.*
4. Diseases of poultry – Biester – Oxford & IBH.

SELF STUDY

1. Poultry equipments

2. Layers and broilers

3. Non nutritive feed additives

4. Poultry manure

5. Aspergillosis and Aflatoxicosis

B.Sc., (Zoology)
Semester V: SBE III

SERICULTURE

Sub Code: 14UZO5S3
Hours/Week: 2
Credits: 2

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:
To provide basic knowledge on the techniques of silk worm culture.

Unit: I **6Hours**
Scope of Sericulture – History- Importance – Sericulture in India — # Sericulture a cottage industry # – Central Silk Board and other agencies.

Unit: II **6Hours**
Moriculture: Mulberry varieties in Tamil Nadu – Methods of propagation – Culture by grafting. Rearing: Irrigation and Manuring – Pruning – # Mulching #.

Unit: III **6Hours**
Life cycle of *Bombyx mori* – Rearing house – # Rearing methods # - Rearing appliances - Feeding of larvae.

Unit: IV **6Hours**
Mounting of Silkworms - Harvesting and # Stifling of cocoons # - storage sorting and deflossing - Silk Reeling.

Unit: V **6Hours**
Silkworm Health and Hygiene - Disease of silkworms: Pebrine – Flacherie – Grasserie - Muscardine - # Marketing of Silk #.

TEXT BOOK:

Ganga.G, Solochana Chetty. J . Indroduction to sericulture. Oxford & IBH Publising Co.Pvt.Ltd. New Delhi.

REFERENCE:

1. FAO, Sericulture Manual – 2 (Silkworm rearing). Oxford & IBH. 1992.
2. FAO, Sericulture Manual – 2 (Silk reeling), Oxford & IBH. 1994.
3. FAO, Silkworm Rearing, Oxford & IBH. 1992.
4. FAO, Silkworm Egg Production. Oxford & IBH. 1993.
5. FAO, Sericulture Training Manual. Oxford & IBH. 1992.

SELF STUDY

1. Sericulture a cottage industry
2. Mulching
3. Rearing methods
4. Stifling of cocoons
5. Marketing of Silk

B.Sc., (Zoology)
Semester V: Extra Credit III

WATER POLLUTION MANAGEMENT

Sub Code: 14 UZO 5EC3
Hours/Week:
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:
To learn about water quality, the reasons for its contamination, the ill effects of polluted water, the ways to protect and enhance its Quality.

Unit: I **15 Hours**

Sources and Types of Water Pollution: Physical, Chemical and Biological sources. Water pollutants-oxygen demanding wastes, # Plant nutrients and synthetic organic compounds #.

Unit: II **15 Hours**

Water Pollutants: Sources of Heavy Metals as Water Pollutants- Mercury, Copper, Cadmium, Chromium, Nickel, Zinc, Lead, Arsenic and Pesticides: Classification and ill effects. Pathogens: # Classification and harmful effects #.

Unit: III **15 Hours**

Water Quality parameter: Total solids, Suspended solids, Turbidity, Colour, # Electrical conductivity, Taste & Odour #, Temperature, Alkalinity, Hardness, Silicate, Nitrogen and Phosphate, Dissolved oxygen, BOD and COD.

Unit: IV **15 Hours**

Water Shed Management: Concept, Characteristics and Types of Water Shed – Water Resources Development – Water Investigation – # Water Shed Management and Water Budget #.

Unit: V **15 Hours**

Water Quality Standards: # Indian and International standards # – WHO, EPA, ISI, ICMR. Environmental Laws and Water pollution Management: Water pollution, prevention and Control Act- Role of Governmental and non-governmental organisations in water pollution control.

Text Books:

1. Goel, P.K and Trivedy, P. Physico - chemical analysis of water and Waste water. Karad Publications, 2005.

2. P.D. Sharma, Ecology and Environment, Rastogi Publication, 2010

Unit I Chapter 3 T.B.1
Unit II Chapter 18 T.B.1
Unit III Chapter 2 T.B.2
Unit IV Chapter 22, 23 T.B.2
Unit V Chapter 18 T.B.2

Books for Reference:

1. G. Allen Burton, Jr., Robert Pitt. Stormwater Effects Handbook: A Textbook for Watershed Managers, Scientists, and Engineers. New York: CRC/Lewis Publishers. 2001.

2. Schueler, Thomas R. "Cars are leading Source of Metal Loads in California." Reprinted in The Practice of Watershed Protection. Center for Watershed Protection. Ellicott City, MD. 2000.

3. Goel, P.K. Water Pollution - Causes, Effects and Control. New Delhi: New Age International. p. 179. 2006.

4. Kennish, Michael J. Ecology of Estuaries: Anthropogenic Effects. Marine Science Series. Boca Raton, FL: CRC Press. pp. 415–17. 1992.

5. Laws, Edward A.. Aquatic Pollution: An Introductory Text. New York: John Wiley and Sons. p. 430. 2000

SELF STUDY

1. Plant nutrients and synthetic organic compounds
2. Classification and harmful effects
3. Electrical conductivity, Taste & Odour
4. Water Shed Management and Water Budget
5. Indian and International standards

BIOCHEMISTRY AND BIOPHYSICS

Sub Code: 14UZO6C12
Hours/Week: 5
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objectives:

- To enable students learn the nature of chemical constituents of living matter and the transformations of these chemical entities in biological systems.
- The last two chapters deal with the physical principles and properties involved in biological systems.

Unit: I **15 Hours**

Introduction of Biochemistry – Scope of Biochemistry – Atomic structure – Chemical bonds – Acids and bases – pH – Water and its functions – Dissolved gases and their properties – Buffer systems – # Chemical equilibrium #.

Unit: II **15 Hours**

Classification, Basic structure and properties of: Carbohydrates, Proteins and Lipids. Vitamins: # Water and Fat soluble vitamins # – Source, function and deficiency diseases.

Unit: III **15Hours**

Enzymes: Classification – Characteristics –# Mechanism of Enzyme Action # – Factors affecting enzyme activity.

Metabolisms: Definition – Glycolysis - TCA cycle – ETS and Oxidative phosphorylation.

Unit: IV **15Hours**

Introduction to Biophysics – Nature and Properties of Light –Electromagnetic spectrum – Absorption and Emission spectrum – Fluorcence and phosphorescence. Bioluminescence – Bio energetics: # Free energy concepts # – Laws of thermodynamics – Redox potential – ATP.

Unit: V **15Hours**

Principle, Working Procedure and Uses of: pH metry, Colorimetry, Spectrophotometry, # Centrifugation and Chromatography #.

Text books:

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

2. Stryer,L., Biochemistry. Wiley International. 1992.

Unit I : **T.1**. Chapter-1-5
Unit II : **T.1**. Chapter-6-8
Unit III : **T.1**. Chapter-9; **T2** Chapter. 22 and 23
Unit IV : **T.1**. Chapter-10, 16
Unit V : **T.1**. Chapter- 11-15

Reference

1. Frunton J.S. & S. Simmonds, G.General and R.H.Dol. Outlines of Biochemistry John Wiley & Sons. 1987.
2. Arumugam,N and Annie. Biochemistry and Biophysics – Saras Publication; Nagarcoil, 2013.
3. Nagabushnam,R. Animal physiology.S. Chand & Co. 1991.
4. Martin, D.W., P.A. Mayes and W.W. Rodwell. Harper's Review of Biochemistry Lange Medical Publications.
5. Prosser, C.L. and F.A. Brown 1985 Comparative Animal Physiology W.B. Suanders. 1983.
6. Rama Rao, A.V.S.S., Biochemistry UBSPD.
7. Narayanan,L.M.Nallasingam,K.Arumugam,N. athima.,D.Pillai,RPM.,Kumar,S.P. Biochemistry - Saras Publication; Nagarcoil, 2003.
8. Ackerman, E. Biophysical Science, Prentice Hall, New Delhi. 1962.
9. Daniel, M. Basic Biophysics for Biologists, Wiley International, New Delhi. 1992.
10. Das.D. Biophysics and Biological Chemistry, Academic Publishers, Calcutta. 1996.
11. Sahay, K.B. and Saxena, R.K. Biomechanics. Wiley Eastern, New Delhi. 1971.
12. Upadhyay, Upadhyay and Math.K. Biophysical Chemistry, Himalaya Publishing House. 1993.

SELF STUDY

1. Chemical equilibrium
2. Water and Fat soluble vitamins
3. Mechanism of Enzyme Action
4. Free energy concepts
5. Centrifugation and Chromatography

B.Sc., (Zoology)
Semester VI: NME III

6C13

IMMUNOLOGY

Sub Code: 14UZO6503
Hours/Week: 5
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:

To impart basic knowledge on Antigens, Immunoglobulins and Immune Response. Also to learn the applications of Immunological Techniques.

Unit I

Scope – History -Types of Immunity :Innate & Acquired. Lymphoid organs : Primary and Secondary. Cells of Immune System : Lymphocyte – Types. # Macrophages # - APC –Mast cells.

Unit II

Antigens – Types - Properties – Haptens. Antibodies –Types - Structure – Functions – Biological properties. # Vaccines and types #.

Unit III

Major Histocompatibility Complex in man - # Human Leukocyte Antigen (HLA) # – Functions. Complements: Salient features -Classical pathway of activation – Functions.

Unit IV

Immune response – Humoral Immune response – Primary and Secondary –Cell mediated Immune response – Hypersensitivity factors – # Common Hypersensitivity Reaction # – Types – Anaphylaxis.

Unit V

Immunological Techniques - Agglutination test – Precipitation test – Immunodiffusion – Immunoelectrophoresis -# ELISA # – Western Blotting - HLA – WIDAL – VDRL test.

Self study

1. Macrophages
2. Vaccine
3. HLA
4. Common hypersensitivity reaction
5. ELISA

Text Book

Nandhini Shetty (1994) Immunology, Introductory Text Book, New Age Int. (P) Ltd. Publications, New Delhi.

Dulsy Fatima et al., (2000) Immunology, Saras Publications, Nagercoil, Tamil Nadu.

Reference Books:

1. Roitt, (3rd Edition) Immunology, Crover Medical Publishing Company, London
2. Barret, J. T. (1983) Text Book of Immunology (5th Edition), The C.V. Mosby Company.
3. Richard, H.M. (1992), Immunology (2nd Edition), Williams and Wilkins, Baltimore Maryland.
4. Hidemann, W.H. (1980) Essentials of Immunology, Elsevier Science Publishing Co. Inc.
5. Weinn. D.M. and Steward, L. (1993), Immunology, Singapore Publishers Private Ltd.,

ECONOMIC ENTOMOLOGY

Sub Code: 14UZO6C14
Hours/Week: 5
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:

To impart a thorough knowledge on the fundamentals of Insects and to highlight their economic importance.

Unit: I **15 Hours**

Classification of insects upto orders and their diagnostic characters with familiar and important examples- # Assessment of insect population # - Economic importance of insects.

Unit: II **15Hours**

Bionomics, lifecycle and byproducts of Honey bee, Silkworm and Lac insect. Helpful insects: Insect pollinators, predators, # Weed killers and scavengers #. Insect pests of domestic animals: Cattle, Fowl, Sheep and Goats-(any two pests).

Unit: III **15Hours**

Biology and lifecycle of Insect Pests of: Rice, Sugarcane, # Coconut #, Cotton, Vegetables and Fruits and Pests of Stored Products (any three pests).

Unit: IV **15 Hours**

Insects as Vectors of Human Diseases: # Biology of Housefly #, Mosquito and Flea, Pests of Poultry.

Unit: V **15Hours**

Principles of Insect Control: Physical, Mechanical, Chemical, Biological and Integrated Methods of Pest Control. # Non-conventional Methods of Pest Control #.

TEXT BOOKS

1. D.B.Tembhare. Moden Entomology. Himalaya Publishing House, Mumbai. (Page No. 568 and 582). 2005.
2. B.Vasantharaj david &T.Kumaraswamy, Elements of Economic Entomology, Popular Book Depot, Chennai. 2000.

REFERENCE:

1. Chandler,A.C. and Dead,C.P. Introduction to Parasitiology. John Wiley and Sons, New York. 1961.
2. David,B.V. and T.Kumarasami. Elements of Economic Entomology. Popular Book Depot, Chennai. 1998.
3. David, B.V. Pest Management and pesticides in Indian Scenario, Namrutha Publications. 1992.
4. Krishnan, N.T. Economic Entomology, J.J. Publications, Madurai. 1993.
5. Nayar,K.K, Anathakrishnan, T.N and David, V.D, General and applied Entomology, Tata Mc Grow Hill, New Delhi. 1990,

SELF STUDY

1. Assessment of insect population
2. Weed killers and scavengers
3. Coconut
4. Biology of Housefly
5. Non-conventional Methods of Pest Control

B.Sc., (Zoology)
SEMESTER VI: CORE XV

EVOLUTION

Sub Code: 14 UZO 6C15
Hours/Week: 4
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:

To have a clear understanding of how life came to existence and later gained complexity.

UNIT I

12 Hours

Evolution concepts & Theories: Abiogenesis, Biogenesis, Organic Evolution and Urey and Miller experiment – Evidences of Evolution: Homologous and Analogous organs. # Adaptive radiation #, Embryological evidences and Biochemical evidences – Forces of evolution: Selection, Recombination, Migration, Mutation and Genetic drift.

UNIT II

12 Hours

Lamarckism: Lamarck and the Concepts of Evolution – Darwinism: Natural Selection Theory and Artificial Selection. Theory of De Vries –Mutation and Evolution – # Neo-Lamarckism # - Neo-Darwinism.

UNIT III

12 Hours

Natural Selection - Species and Speciation – Isolation and Isolating Mechanism – # Variation # - Mimicry and Colouration and their role in Evolution – Animal Extinction and Evolution.

UNIT IV

12 Hours

Orthogenesis - Evolution of Horse: Evolutionary trends, Fossil horses. # Evolution of Elephant # - Evolution of Man – Cultural Evolution in Man.

UNIT V

12 Hours

Geological Time Scale: Eras, Periods and Epochs – Fossils: Types and Formation – Connecting Links – # Missing Links # - Patterns of Evolution; Sequential Evolution, Divergent Evolution, Microevolution and Macroevolution.

TEXT BOOK.

1. Arumugam, N, 2006. Organic Evolution, Saras publication, Nagercoil.

UNIT I	TB 1 Chapter 1-3
UNIT II	TB 1 Chapter 4-8
UNIT III	TB 1 Chapter 10, 20 - 22
UNIT V	TB 1 Chapter 28- 31
UNIT IV	TB 1 Chapter 32, 33, & 26

REFERENCE.

1, Savage.Evolution, Modern Biology Series, (1969).
2, Dowdeswell,P.M. The Mechanisam of Evolution, Heinemann London.(1956).
3, Mayr.El. Animal species and evolution. Harvard University Press.(1963).
4, Simpson,G.G.The major features of Evolution, CUP.(1953).

SELF STUDY

1. Adaptive radiation
2. Neo-Lamarckism
3. Variation
4. Evolution of Elephant
5. Missing Links

11UZO6C16

B.Sc., (Zoology)
Semester VI: CORE XVI

ENVIRONMENTAL BIOLOGY

Sub Code: 11 UZO 6C16
Hours/Week: 4
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objectives:

To realize the importance of interrelationship between every organism and its environment. Also to study the impact of ecological factors on the distribution and life of organisms.

Unit: I **15 Hours**

Scope – Branches of Ecology – # Abiotic factors #: Light, Temperature, Water and Soil and their impact on organisms.

Unit: II **15 Hours**

Biotic factors – Animal relationships – Symbiosis, Commensalisms, Mutualism, Antagonism, Predation, Parasitism and Competition – Intraspecific and Interspecific competition. Ecosystem: Fresh water ecosystem – Pond & River ecosystem – Food chain – Food web – Trophic levels – Energy flow – # Ecological pyramids # – Pyramid of Biomass, Number and Energy.

Unit: III **15 Hours**

Population Ecology – Definition – Natality, Mortality, Population Fluctuation, Dispersal. Population estimation - Population Equilibrium, Regulation.
Community Ecology – Types and # Characteristics of community #. Stratification – Ecotone – Edge effect – Ecological niche – Ecological succession

Unit: IV **15 Hours**

Natural Resources - Renewable and Non-renewable - Resources Management. Wild life Conservation and Management. Remote Sensing Techniques in Resources Management – Water / Land - Space Ecology. Biodiversity – Types – Mega diversity with reference to India – # Conservation of Biodiversity #.

Unit: V **15 Hours**

Pollution – Types : Air and Water Pollution - Their biological effects and control. Sewage and Solid Waste disposal and Management – # Green House Effect # – Ozone Layer and its significance, Global Warming, Acid Rain, Biomagnification – Eutrophication .

TEXT BOOK:

1. Odum, E.P. 1996. Fundamentals of Ecology (III Edn.), Natraj Pub. Dehradun.

REFERENCE:

1. Clarke, G.L. Elements of Ecology. John Wiley & Sons, N:y. 1954.
2. Kendeigh,S.C. Animal Ecology. Prentice Hall. 1961.
3. Rastogi,V.B.and M.S. Jayaraj. Animal Ecology and Distribution of Animals, Kedarnath Ramnath. 1989.
4. Sharma,P.D. Ecology and Environment. Rastogi Publications. Meerut. 1990.
5. Southwick,C.H. Ecology and the quality of Environment. D.Vas Nostrand Co. 1976.
6. Verma, P.S. and V.K. Agarwal, Principles of Ecology. S.Chand & Co. New Delhi. 1996.

SELF STUDY:

1. Abiotic factors
2. Ecological pyramids
3. Characteristics of community
4. Conservation of Biodiversity
5. Green House effect

BIOCHEMISTRY, BIOPHYSICS, IMMUNOLOGY, ECONOMIC ENTOMOLOGY, EVOLUTION AND ENVIRONMENTAL BIOLOGY – Practical

Sub Code: 14UZO6C17P
Hours/Week: 4
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Biochemistry

pH measurement of various samples. Quantitative estimation of Proteins and Free Sugars.

Spotters: Models of Hemoglobin, ATP.

Biophysics

Verification of Beer Lambert's Law using Colorimeter, Paper Chromatography (Demo).

Spotters: Spectrophotometer, Centrifuge, Electrophoresis.

Immunology

Primary and Secondary Lymphoid organs.

Spotters: Immunoelectrophoresis – ELISA, Blotting techniques.

Economic Entomology

Productive insects – Honey Bee, Silkworm

Useful insects- Pollinators, Biocontrol insects (Assassin bugs) .

Pest of crops – Pulses, Oil crops

Pest of animals – Fowls

Evolution

Colouration and Mimicry

Fossil : Nautiloid, Ammonoid

Environmental Biology

Estimation of $_{p}$H, Dissolved oxygen, Salinity and Calcium

Examination of Plankton: Qualitative and Quantitative

Examination of Intertidal fauna : Rocky shore, Sandy shore, Muddy shore.

Spotters: Animal association, PH meter, Secchi disc, Turbidity meter, Electrical conductivity meter.

Field Trip

Visit to Sea shore to study Intertidal fauna and adaptations.

Submission of a Field Report is mandatory.

Record Work

A record of lab work should be maintained and submitted at the time of Practical Examination for valuation.

B.Sc., (Zoology)
Semester III: SBE IV

DAIRY FARMING

Sub Code: 14UZO6S4
Hours/Week: 2
Credits: 2

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:
To impart training on Modern Dairy Farming Technology and to create knowledge on Self Employment opportunityies.

Unit: I **6 Hours**
Dairy industry in India and its development – # Growth, Economics and Applications # – Milk, Milk products and Processing units.

Unit: II **6 Hours**
Breeds of Dairy animals # (Cow, Buffalo and Goat) and their characteristics.

Unit: III **6 Hours**
Dairy farm: Construction Methods – # Rearing of cattle # - Raising the dairy calf, – Farm equipments (Milk machines, chaff cutter, milk cans and containers for liquid food).

Unit: IV **6 Hours**
Nutrition: Food stuff, Natural and Artificial feed – # Food requirements for cattle # (growing, pregnant and lactating forms)-Feeding of young calves.

Unit: V **6 Hours**

Cattle diseases and their control – # Vaccination programme # – Periodical inspection of cattles for their health.

TEXT BOOK:

1. Shukla, G.S. & Upadhyay V.B. Economic Zoology, Rastogi Publication. 2005.

REFERENCES:

1. Banerjee.G.C. A text book of Animal Husbandry, Oxford & IBH Publishing Co. PVT Ltd. 1998.
2. James R Gillespie. Modern livestock and poultry production, Delmar Publication.
3. Gopalakrishnan and G.M.Lal Livestock and Poultry enterprise for rural development., Vikas Publishing House Pvt. Ltd.
4. ICAR Handbook. Hand Book of Animal Husbandry, ICAR Publication New Delhi. 2002.

SELF STUDY

1. Growth, economics and applications
2. Breeds of Dairy animals
3. Rearing of cattle
4. Food requirements for cattle
5. Vaccination programme

Comprehensive Examinations in Zoology

Sub Code: 14UZO6EC4
Hours/Week:
Credits: 4

Max Marks: 100
Internal Marks: 40
External Marks: 60

Objective:

To enable students appear for Competitive Exam in Zoology with confidence.

Unit I

Classification of Invertebrates upto phyla with diagnostic features and examples. Cockroach: External morphology, mouth parts, digestive system, respiratory system, circulatory system, nervous system and reproductive system.

Unit II

General characters of Chordates - Classification of Vertebrata upto classes with suitable examples. Frog – External features, digestive system, respiratory system, circulatory system, nervous system and urino-genital system.

Unit III

Physiology of digestion and absorption, respiration, transport of oxygen and carbon-dioxide, structure of kidney and nephron, urine formation.... IN MAN.

Structure, composition and functions of blood of man, types of muscle, structure of neuron, nerve impulse conduction - physiology of vision in man.

Structure and functions of Pituitary, Islets of Langerhans, Human Reproductive Systems – Menstrual cycle.

Unit IV

Major infectious and communicable diseases (malaria, filaria, tuberculosis, cholera and AIDS) their vectors, pathogens and prevention.
Pests of sugarcane (Pyrilla perpusilla), oil seed (Achaea janata) and rice (Sitophilus oryzae).

Unit V

Apiculture, sericulture, lac culture, carp culture, pearl culture, prawn culture and vermiculture.