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Silchar - 788011

COURSE STRUCTURE:

Choice Based Credit System for B.Sc. Zoology Pass Course

Semester	Discipline Specific Core Course DSC (12)	Ability Enhancement Compulsory Courses AEC (2)	Skill Enhancement Courses SEC (4)	Discipline Specific Elective DSE (4)
I	**ZOODSC - 101/ZOOGE - 101** (Animal Diversity)	English Communication		
II	**ZOODSC – 201/ ZOOGE – 201** (Comparative Anatomy and Developmental Biology of Vertebrates)	Environmental Science		
III	**ZOODSC 301/ ZOOGE - 301** (Physiology and Biochemistry)		**ZOOSEC - 301** (Apiculture)	
IV	**ZOODSC – 401/ GE - 401** (Genetics and Evolutionary Biology)		**ZOOSEC - 401** (Medical Diagnostics)	
V			**ZOOSEC - 501** (Aquarium Fish Keeping)	**ZOODSE - 501** (Immunology)
VI			**ZOOSEC - 601** (Sericulture)	**ZOODSE - 601** (Reproductive Biology)

N.B.:

1. ZOODSE-101 = ZOOGE-101 = ZOOGE-501: Animal Diversity (T & L)
2. ZOODSE-201 = ZOOGE-201 = ZOOGE-601: Comparative Anatomy & Developmental Biology of Vertebrates (T&L)
3. ZOOSEC-501 = ZOOSEC-401 = Medical Diagnostics

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DISCIPLINE SPECIFIC CORE COURSE/GENERAL ELECTIVE

ZOODSC – 101/ GE - 101: (Theory)

Animal Diversity

Credits 4 | Contact hours 60 | Marks 50

(Each unit carries 10 marks)

Unit 1: Protozoa, Porifera and Cnidaria

1. General characters and classification of Protozoa up to classes; Locomotory Organelles and locomotion in Protozoa
2. General characters and classification of Porifera up to classes; Canal System in *Sycon*
3. General characters and classification up of Cnidaria to classes; Polymorphism in Siphonophora

Unit 2: Platyhelminthes, Nemathelmithes and Annelida

1. General characters and classification of Platyhelminthes up to classes; Life history of *Taenia solium*
2. General characters and classification of Nemathelminthes up to classes; Life history of *Ascaris lumbricoides* and its parasitic adaptations
3. General characters and classification of Annelida up to classes; Digestive System of Leech

Unit 3: Arthropoda, Mollusca and Echinodermata

1. General characters and classification of Arthropoda up to classes; Vision in Arthropoda, Metamorphosis in Insects
2. General characters and classification of Mollusca up to classes; Torsion in gastropods
3. General characters and classification of Echinodermata up to classes; Water- vascular system in Star Fish

Unit 4: Protochordates, Agnatha and Pisces

1. General features of Protochordates
2. General features of Agnatha and classification of Cyclostomes up to classes
3. General features and Classification of Pisces up to orders; Osmoregulation in Fishes

Unit 5: Amphibia, Reptiles, Aves and Mammals

1. General features and Classification of Amphibia up to orders; Parental care
2. General features and Classification of Reptilia up to orders; Poisonous and non-poisonous snakes, Biting mechanism in snakes
3. General features and Classification of Aves up to orders; Flight adaptations in birds
4. Classification of Mammals up to orders; Monotremata, Marsupials and Placentals – their characteristic features

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ZOODSC – 101/ GE - 101: (Practical)
Animal Diversity

Credits 2 Marks 30

1. Study of the following specimens: *Amoeba*, *Euglena, Plasmodium, Paramecium, Sycon*, *Hyalonema,* and *Euplectella, Obelia, Physalia, Aurelia, Tubipora, Metridium, Taenia solium,* Male and female *Ascaris lumbricoides, Aphrodite, Nereis, Pheretima, Hirudinaria, Palaemon, Cancer*, *Limulus*, *Palamnaeus, Scolopendra*, *Julus*, *Periplaneta, Apis, Chiton, Dentalium, Pila, Unio,Loligo, Sepia, Octopus, Pentaceros, Ophiura, Echinus, Cucumaria* and *Antedon, Balanoglossus, Herdmania, Branchiostoma, Petromyzon, Sphyrna, Pristis, Torpedo, Labeo, Exocoetus, Anguilla, Ichthyophis/Ureotyphlus, Salamandra, Bufo, Hyla, Chelone, Hemidactylus, Chamaeleon, Draco, Vipera, Naja, Crocodylus, Gavialis,* Any six common birds from different orders, *Sorex*, Bat, *unambulus, Loris*.

2. Study of the following permanent slides: T.S. and L.S. of *Sycon*, Study of life history stages of *Taenia,* T.S. of Male and female *Ascaris*

3. Key for Identification of poisonous and non-poisonous snakes. An "animal album" containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

Suggested Readings:

- Ruppert and Barnes, R.D. (2006). *Invertebrate Zoology*, VIII Edition. Holt Saunders International Edition.
- Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002).
- *The Invertebrates: A New Synthesis*, III Edition, Blackwell Science
- Young, J. Z. (2004). *The Life of Vertebrates*. III Edition. Oxford university press.
- Pough H. *Vertebrate life,* VIII Edition, Pearson International.
- Hall B.K. and Hallgrimsson B. (2008). *Strickberger's Evolution*. IV Edition. Jones and Bartlett Publishers Inc.

Marks Distribution:

Internal		: 20 marks
Theory		: 50 marks
Practical		: 30 marks
Identification	: 21	
Regularity	: 5	
Laboratory Notebook	: 2	
Viva voce	: 2	

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ZOODSC – 201/ GE - 201: (Theory)
Comparative Anatomy and Developmental Biology of Vertebrates

Credits 4 Contact hours 60 Marks 50

(Each unit carries 10 marks)

Unit 1: Integumentary System and Skeletal System

1. Derivatives of integument w.r.t. glands and digital tips
2. Evolution of visceral arches

Unit 2: Digestive System and Respiratory System

1. Brief account of alimentary canal and digestive glands
2. Brief account of Gills, lungs, air sacs and swim bladder

Unit 3: Circulatory System and Urinogenital System

1. Evolution of heart and aortic arches
2. Succession of kidney, Evolution of urinogenital ducts

Unit 4: Nervous System and Sense Organs

1. Comparative account of brain

Unit 5: Early Embryonic Development

1. Gametogenesis: Spermatogenesis and oogenesis w.r.t. mammals,
2. Fertilization: external (amphibians), internal (mammals), blocks to polyspermy;
3. Early development of humans (structure of mature egg and its membranes, patterns of cleavage, fate map, up to formation of gastrula);
4. Implantation of embryo in humans, Formation of human placenta and functions, other types of placenta on the basis of histology;

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ZOODSC – 201/ GE - 201: (Practical)
Comparative Anatomy and Developmental Biology of Vertebrates

Credits 2 Marks 30

1. Osteology:
   a) Disarticulated skeleton of fowl and rabbit
   b) Mammalian skulls: One herbivorous and one carnivorous animal.
2. Frog - Study of developmental stages - whole mounts and sections through permanent slides – cleavage stages, blastula, gastrula, tadpole external and internal gill stages.
3. Study of the different types of placenta- histological sections through permanent slides or photomicrographs.
4. Study of placental development in humans by ultrasound scans or photographs
5. Examination of gametes - frog/rat - sperm and ova through permanent slides or photomicrographs.

Suggested Readings

- Kardong, K.V. (2005) *Vertebrates' Comparative Anatomy, Function and Evolution*. IV Edition. McGraw-Hill Higher Education.
- Kent, G.C. and Carr R.K. (2000). *Comparative Anatomy of the Vertebrates*. IX Edition. The McGraw-Hill Companies.
- Hilderbrand, M and Gaslow G.E. *Analysis of Vertebrate Structure*, John Wiley and Sons.
- Walter, H.E. and Sayles, L.P; *Biology of Vertebrates*, Khosla Publishing House.
- Gilbert, S. F. (2006). Developmental Biology, VIII Edition, Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, USA.
- Balinsky, B.I. (2008). An introduction to Embryology, International Thomson Computer Press.
- Carlson, Bruce M (1996). Patten's Foundations of Embryology, McGraw Hill, Inc.

Marks Distribution

Internal	: 20 marks
Theory	: 50 marks
Practical	: 30 marks
Identification	: 21
Regularity	: 5
Laboratory Notebook	: 2
Viva voce	: 2

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ZOODSC – 301/ GE - 301: (Theory)
Physiology and Biochemistry

Credits 4 | Contact hours 60 | Marks 50

(Each unit carries 10 marks)

Unit 1: Nerve and muscle

1. Structure of a neuron, Resting membrane potential, Graded potential,
2. Origin of Action potential and its propagation in myelinated and non-myelinated nerve fibres,
3. Ultra-structure of skeletal muscle, Molecular and chemical basis of muscle contraction

Unit 2: Digestion and Respiration

1. Physiology of digestion in the alimentary canal; Absorption of carbohydrates, proteins & lipids
2. Pulmonary ventilation, Respiratory volumes and capacities, Transport of Oxygen and carbon dioxide in blood

Unit 3: Excretion and Cardiovascular System

1. Structure of nephron, Mechanism of Urine formation, Counter-current Mechanism
2. Composition of blood, Hemostasis, Structure of Heart, Origin and conduction of the cardiac impulse, Cardiac cycle

Unit 4: Reproduction and Endocrine Glands

1. Physiology of male reproduction: hormonal control of spermatogenesis; Physiology of female reproduction: hormonal control of menstrual cycle
2. Structure and function of pituitary, thyroid, Parathyroid, pancreas and adrenal

Unit 5: Enzymes and Metabolism

1. Classification and nomenclature of enzymes, Mechanism of action, Enzyme Kinetics
2. Glycolysis, Krebs Cycle, Pentose phosphate pathway, Gluconeogenesis, Electron transport chain
3. Biosynthesis and β oxidation of palmitic acid Transamination, Deamination and Urea Cycle

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ZOODSC – 301/ GE - 301: (Practical)
Physiology and Biochemistry

Credits 2 Marks 30

1. Preparation of hemin crystals
2. Study of permanent histological sections of mammalian pituitary, thyroid, pancreas, adrenal gland
3. Study of permanent slides of spinal cord, duodenum, liver, lung, kidney, bone, cartilage
4. Qualitative tests to identify functional groups of carbohydrates in given solutions (Glucose, Fructose, Sucrose, Lactose)
5. Study of activity of salivary amylase under optimum conditions

Suggested Readings

- Tortora, G.J. and Derrickson, B.H. (2009). *Principles of Anatomy and Physiology*, XII Edition, John Wiley & Sons, Inc.
- Widmaier, E.P., Raff, H. and Strang, K.T. (2008) *Vander's Human Physiology*, XI
- Edition., McGraw Hill
- Guyton, A.C. and Hall, J.E. (2011). T*extbook of Medical Physiology*, XII Edition, Harcourt Asia Pvt. Ltd/ W.B. Saunders Company
- Berg, J. M., Tymoczko, J. L. and Stryer, L. (2006). *Biochemistry*. VI Edition. W.H
- Freeman and Co.
- Nelson, D. L., Cox, M. M. and Lehninger, A.L. (2009). *Principles of iochemistry*. IV Edition. W.H. Freeman and Co.
- Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009). *Harper's Illustrated Biochemistry*. XXVIII Edition. Lange Medical Books/Mc Graw3Hill.

Marks Distribution

Internal		: 20 marks
Theory		: 50 marks
Practical		: 30 marks
Experiment	: 15	
Identification	: 6	
Regularity	: 5	
Laboratory Notebook	: 2	
Viva voce	: 2	

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ZOODSC – 401/ GE - 401: (Theory)

Genetics and Evolutionary Biology

Credits 4 | Contact hours 60 | Marks 50

(Each unit carries 10 marks)

Unit 1: Introduction to Genetics and Mendelian Genetics

1. Mendel's work on transmission of traits, Genetic Variation, Molecular basis of Genetic Information
2. Principles of Inheritance, Chromosome theory of inheritance, Incomplete dominance and codominance, Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, sex linked inheritance, extra-chromosomal inheritance

Unit 2: Linkage, Crossing Over and Chromosomal Mapping

1. Linkage and crossing over, Recombination frequency as a measure of linkage intensity, two factor and three factor crosses, Interference and coincidence,
2. Somatic cell genetics – an alternative approach to gene mapping

Unit 3: Mutations

1. Chromosomal Mutations: Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy;
2. Gene mutations: Induced versus Spontaneous mutations, Back versus Suppressor mutations,

Unit 4: History of Life and Evolutionary Theories

1. Major Events in History of Life Lamarckism, Darwinism, Neo-Darwinism
2. Types of fossils, Incompleteness of fossil record, Dating of fossils, Phylogeny of horse

Unit 5: Processes of Evolutionary Change and Species Concept

1. Organic variations; Isolating Mechanisms; Natural selection (Example: Industrial melanism); Types of natural selection (Directional, Stabilizing, Disruptive), Artificial selection
2. Biological species concept (Advantages and Limitations); Modes of speciation (Allopatric, Sympatric)

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ZOODSC – 401/ GE - 401: (Practical)
Genetics and Evolutionary Biology

Credits 2 Marks 30

1. Study of Mendelian Inheritance and gene interactions (Non Mendelian Inheritance) using suitable examples. Verify the results using Chi-square test.
2. Study of Human Karyotypes (normal and abnormal) using pictures and models.
3. Study of fossil evidences from plaster cast models and pictures
4. Study of homology and analogy from suitable specimens/ pictures
5. Charts: Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors

Suggested Readings:

- Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008). *Principles of Genetics*. VIII Edition. Wiley India.
- Snustad, D.P., Simmons, M.J. (2009). *Principles of Genetics*. V Edition. John Wiley and Sons Inc.
- Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). *Concepts of Genetics*. X Edition. Benjamin Cummings.
- Russell, P. J. (2009). *Genetics- A Molecular Approach.* III Edition. Benjamin Cummings.
- Griffiths, A.J.F., Wessler, S.R., Lewontin, R.C. and Carroll, S.B. *Introduction to Genetic Analysis*. IX Edition. W. H. Freeman and Co.
- Ridley, M. (2004). *Evolution*. III Edition. Blackwell Publishing
- Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H. (2007). *Evolution*. Cold Spring, Harbour Laboratory Press.
- Hall, B. K. and Hallgrimsson, B. (2008). *Evolution*. IV Edition. Jones and Bartlett
- Publishers
- Campbell, N. A. and Reece J. B. (2011). *Biology*. IX Edition,
- Pearson, Benjamin, Cummings. Douglas, J. Futuyma (1997). *Evolutionary Biology*. Sinauer Associates.

Marks Distribution:

Internal	: 20 marks
Theory	: 50 marks
Practical	: 30 marks
Experiment	: 7
Identification	: 14
Regularity	: 5
Laboratory Notebook	: 2
Viva voce	: 2

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DISCIPLINE SPECIFIC ELECTIVE

ZOODSE – 501: Immunology (Theory)

Credits 4 Contact hours 60 Marks 50

(Each unit carries 10 marks)

Unit 1: Overview of the Immune System

1. Introduction to basic concepts in immunology, components of immune system, principles of innate and adaptive immune system

Unit 2: Cells and Organs of the Immune System

1. Haematopoeisis, Cells of immune system and organs (primary and secondary lymphoid organs) of the immune system

Unit 3: Antigens and Antibodies

1. Basic properties of antigens, B and T cell epitopes, haptens and adjuvants; Structure, classes and function of antibodies, monoclonal antibodies, antigen antibody interactions as tools for research and diagnosis

Unit 4: Working of the Immune System

1. Structure and functions of MHC, exogenous and endogenous pathways of antigen presentation and processing, Basic properties and functions of cytokines, Complement system: Components and pathways.

Unit 5: Immune System in Health and Disease

1. Introduction to concepts of autoimmunity and immunodeficiency; AIDS; General introduction to vaccines, Various types of vaccines

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ZOODSE – 501: Immunology (Practical)

Credits 2 Marks 30

1. Demonstration of lymphoid organs through audio-visual aids
2. Histological study of spleen, thymus and lymph nodes through slides/ photographs
3. Preparation of stained blood film to study various types of blood cells.
4. ABO blood group determination.
5. Demonstration of ELISA and Immunoelectrophoresis through audio-visual aids

Suggested Readings

- Kindt, T. J., Goldsby, R.A., Osborne, B. A. and Kuby, J (2006). *Immunology*, VI Edition. W.H. Freeman and Company.
- David, M., Jonathan, B., David, R. B. and Ivan R. (2006). *Immunology,* VII Edition, Mosby, Elsevier Publication.
- Abbas, K. Abul and Lechtman H. Andrew (2003.) *Cellular and Molecular Immunology.* V Edition. Saunders Publication.

Marks Distribution

Internal		: 20 marks
Theory		: 50 marks
Practical		: 30 marks
Experiment I	: 8	
Experiment II	: 7	
Identification	: 6	
Regularity	: 5	
Laboratory Notebook	: 2	
Viva voce	: 2	

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ZOODSE – 601: Reproductive Biology (Theory)

Credits 4 | Contact hours 60 | Marks 50

(Each unit carries 10 marks)

Unit 1: Reproductive Endocrinology

1. Reproductive System of Rat and Human: Development and differentiation of gonads, genital ducts, external genitalia.
2. Gonadal hormones and mechanism of hormone action, steroids, glycoprotein hormones, and prostaglandins, hypothalamo – hypophyseal – gonadal axis

Unit 2: Functional Anatomy of Male Reproduction

1. Outline and histology of male reproductive system in rat and human;
2. Testis: Cellular functions, germ cell, system cell renewal;
3. Spermatogenesis: kinetics and hormonal regulation; Epididymal function and sperm maturation;
4. Accessory glands functions; Sperm transportation in male tract

Unit 3: Functional Anatomy of Female Reproduction

1. Outline and histology of female reproductive system in rat and human;
2. Ovary: folliculogenesis, ovulation, corpus luteum formation and regression;
3. Steroidogenesis and secretion of ovarian hormones;

Unit 4: Hormonal regulation of Female Reproductive Cycles

1. Reproductive cycles (rat and human) and their regulation, changes in the female tract;
2. Ovum transport in the fallopian tubes; Sperm transport in the female tract, fertilization;
3. Hormonal control of implantation; Hormonal regulation of gestation, pregnancy diagnosis, foeto –maternal relationship;
4. Mechanism of parturition and its hormonal regulation; Lactation and its regulation

Unit 5: Reproductive Health

1. Infertility in male and female: causes, diagnosis and management;
2. Assisted Reproductive Technology: sex selection, sperm banks, frozen embryos, in vitro fertilization and embryo transfer
3. Modern contraceptive technologies; Family planning

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ZOODSE – 601: Reproductive Biology (Practical)

Credits 2 Marks 30

1. Study of animal house through powerpoint presentation: set up and maintenance of animal house, breeding techniques, care of normal and experimental animals.
2. Surgical techniques through powerpoint presentation: principles of surgery in endocrinology.
3. Ovarectomy, hysterectorny, castration and vasectomy in rats.
4. Examination of histological sections from photomicrographs/ permanent slides of rat/human: testis, epididymis and accessory glands of male reproductive systems;
5. Sections of ovary, fallopian tube, uterus (proliferative and secretory stages), cervix and vagina.
6. Study of permanent slides of T.S. of mammalian testes and ovary

Suggested Readings:

- Austin, C.R. and Short, R.V. reproduction in Mammals. Cambridge University Press.
- Degroot, L.J. and Jameson, J.L. (eds). Endocrinology. W.B. Saunders and Company.
- Knobil, E. et al. (eds). The Physiology of Reproduction. Raven Press Ltd.
- Hatcher, R.A. et al. The Essentials of Contraceptive Technology. Population Information Programme.

Marks Distribution:

Internal		: 20 marks
Theory		: 50 marks
Practical		: 30 marks
Identification	: 21	
Regularity	: 5	
Laboratory Notebook	: 2	
Viva voce	: 2	

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SKILL ENHANCEMENT COURSES

ZOOSEC – 301: Apiculture

Credits 2 | Contact hours 30 | Marks 50

(Each unit carries 10 marks)

Unit 1: Biology of Bees

1. History, Classification and Biology of Honey Bees
2. Social Organization of Bee Colony

Unit 2: Rearing of Bees

1. Artificial Bee rearing (Apiary), Beehives – Newton and Langstroth; Bee Pasturage
2. Selection of Bee Species for Apiculture Bee Keeping Equipment
3. Methods of Extraction of Honey (Indigenous and Modern)

Unit 3: Diseases and Enemies

1. Bee Diseases and Enemies Control and Preventive measures

Unit 4: Bee Economy

1. Products of Apiculture Industry and its Uses (Honey, Bees Wax, Propolis), Pollen etc

Unit 5: Entrepreneurship in Apiculture

1. Bee Keeping Industry – Recent Efforts, Modern Methods in employing artificial
2. Beehives for cross pollination in horticultural gardens

Suggested Readings:

- Prost, P. J. (1962). *Apiculture*. Oxford and IBH, New Delhi.
- Bisht D.S., *Apiculture*, ICAR Publication.
- Singh S., *Beekeeping in India*, Indian council of Agricultural Research, NewDelhi.

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ZOOSEC – 401: Medical Diagnostics

Credits 2 | Contact hours 30 | Marks 50

(Each unit carries 10 marks)

Unit 1: Introduction and Diagnostics Methods Used for Analysis of Blood

1. Importance of medical diagnostics;
2. Blood composition, Preparation of blood smear and Differential Leucocyte Count (D.L.C) using Leishman's stain,
3. Platelet count using haemocytometer, Erythrocyte Sedimentary Rate (E.S.R), Packed Cell Volume (P.C.V.)

Unit 2: Diagnostic Methods Used for Urine Analysis

1. Urine Analysis: Physical characteristics; Abnormal constituents

Unit 3:Non-infectious Diseases

1. Causes, types, symptoms, complications, diagnosis and prevention of Diabetes (Type I and Type II), Hypertension (Primary and secondary),
2. Testing of blood glucose using Glucometer/Kit

Unit 4: Infectious Diseases

1. Causes, types, symptoms, diagnosis and prevention of Tuberculosis and Hepatitis

Unit 5: Tumours

1. Types (Benign/Malignant), Detection and metastasis;
2. Medical imaging: X-Ray of Bone fracture, PET, MRI and CT Scan (using photographs).

Suggested Readings:

- Park, K. (2007), *Preventive and Social Medicine*, B.B. Publishers
- Godkar P.B. and Godkar D.P. *Textbook of Medical Laboratory Technology*, II Edition, Bhalani Publishing House
- Cheesbrough M., *A Laboratory Manual for Rural Tropical Hospitals, A Basis for Training Courses*
- Guyton A.C. and Hall J.E. T*extbook of Medical Physiology*, Saunders
- Robbins and Cortan, *Pathologic Basis of Disease*, VIIIEdition, Saunders
- Prakash, G. (2012), *Lab Manual on Blood Analysis and Medical Diagnostics*,
- S. Chand and Co. Ltd.

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ZOOSEC – 501: Aquarium Fish Keeping

Credits 2 | Contact hours 30 | Marks 50

(Each unit carries 10 marks)

Unit1: Introduction to Aquarium Fish Keeping

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

Unit 2: Biology of Aquarium Fishes

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

Unit 3: Food and feeding of Aquarium fishes

1. Use of live fish feed organisms.
2. Preparation and composition of formulated fish feeds

Unit 4: Fish Transportation

1. Live fish transport - Fish handling, packing and forwarding techniques.

Unit 5: Maintenance of Aquarium

1. General Aquarium maintenance – budget for setting up an Aquarium Fish Farm as a Cottage Industry

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ZOOSEC – 601: Sericulture

Credits 2 | Contact hours 30 | Marks 50

(Each unit carries 10 marks)

Unit 1: Introduction

1. Sericulture: Definition, history and present status; Silk route
2. Types of silkworms, Distribution and Races
3. Exotic and indigenous races; Mulberry and non-mulberry Sericulture

Unit 2: Biology of Silkworm

1. Life cycle of *Bombyx mori*
2. Structure of silk gland and secretion of silk

Unit 3: Rearing of Silkworms

1. Selection of mulberry variety and establishment of mulberry garden Rearing house and rearing appliances;
2. Disinfectants: Formalin, bleaching powder, RKO;
3. Silkworm rearing technology: Early age and Late age rearing Types of mountages; Spinning, harvesting and storage of cocoons

Unit 4: Pests and Diseases

1. Pests of silkworm: Uzi fly, dermestid beetles and vertebrates
2. Pathogenesis of silkworm diseases: Protozoan, viral, fungal and bacterial Control and prevention of pests and diseases

Unit 5: Entrepreneurship in Sericulture

1. Prospectus of Sericulture in India: Sericulture industry in different states, employment, potential in mulberry and non-mulberry sericulture.
2. Visit to various sericulture centers

Suggested Readings

- Manual on Sericulture; Food and Agriculture Organisation, Rome 1976
- Handbook of Practical Sericulture: S.R. Ullal and M.N. Narasimhanna CSB, Bangalore
- Silkworm Rearing and Disease of Silkworm, 1956, Ptd. By Director of Ptg., Stn. & Pub. Govt. Press, Bangalore
- Appropriate Sericultural Techniques; Ed. M. S. Jolly, Director, CSR & TI, Mysore.
- Handbook of Silkworm Rearing: Agriculture and Technical Manual-1, Fuzi Pub. Co. Ltd., Tokyo, Japan1972.
- Manual of Silkworm Egg Production; M. N. Narasimhanna, CSB, Bangalore 1988.
- Silkworm Rearing; Wupang—Chun and Chen Da-Chung, Pub. By FAO, Rome 1988.
- A Guide for Bivoltine Sericulture; K. Sengupta, Director, CSR & TI, Mysore 1989.
- Improved Method of Rearing Young age silkworm; S. Krishnaswamy, reprinted CSB, Bangalore, 1986.