

U.G. COURSES

ZOOLOGY SYLLABUS

(SEMESTER: I - V)

2022 – 23



RAYALASEEMA UNIVERSITY

KURNOOL

RAYALASEEMA UNIVERSITY, KURNOOL
ZOOLOGY SYLLABUS FOR I SEMESTER – 2022-23

PAPER – I: ANIMAL DIVERSITY – BIOLOGY OF NONCHORDATES

HOURS: 60 (5X12)

Max. Marks: 100

UNIT I

1.1 Principles of Taxonomy – Binomial nomenclature – Rules of nomenclature

Phylum Protozoa

1.2 General Characters and classification of protozoa up to classes with suitable examples

1.3 *Elphidium* (type study)

UNIT –II

Phylum Porifera

2.1 General characters and classification up to classes with suitable examples

2.2 Skelton in Sponges

2.3 Canal system in sponges

Phylum Coelenterata

2.4 General characters and classification up to classes with suitable examples

2.5 Metagenesis in *Obelia*

2.6 Polymorphism in coelenterates

Unit – III

Phylum Platyhelminthes

3.1 General characters and classification up to classes with suitable examples

3.2 Life cycle and pathogenecity of *Fasciola hepatica*

3.3 Parasitic Adaptations in helminthes

Phylum Nemathelminthes

3.4 General characters and classification up to classes with suitable examples

Unit – IV

Phylum Annelida

4.1 General characters and classification up to classes with suitable examples

4.2 Vermiculture - Scope, significance, earthworm species, processing,

Vermicompost, economic importance of vermicompost

Phylum Arthropoda

4.3 General characters and classification up to classes with suitable examples

4.4 Metamorphosis in Insects

4.5 *Peripatus* - Structure and affinities

Unit – V

Phylum Mollusca

5.1 General characters and classification up to classes with suitable examples

5.2 Pearl formation in Pelecypoda

Phylum Echinodermata

5.3 General characters and classification up to classes with suitable examples

5.4 Water vascular system in star fish

5.5 Larval forms of Echinodermata

Phylum Hemichordata

5.6 General characters and classification up to classes with suitable examples

5.7 *Balanoglossus* - Structure and affinities

ZOOLOGY PRACTICAL SYLLABUS FOR I SEMESTER

ZOOLOGY - PAPER - I

ANIMAL DIVERSITY - BIOLOGY OF NONCHORDATES

Periods: 24

Max. Marks: 50

Syllabus :

1. Study of museum slides / specimens / models (Classification of animals up to orders)

Protozoa: *Amoeba*, *Paramoecium*, *Paramoecium* Binary fission and Conjugation, *Vorticella*, *Entamoebahistoltyica*, *Plasmodium vivax*

Porifera: *Sycon*, *Spongilla*, *Euspongia*, *Sycon*- T.S & L.S, Spicules, Gemmule

Coelenterata: *Obelia* – Colony & *Medusa*, *Aurelia*, *Physalia*, *Verella*, *Corallium*, *Gorgonia*, *Pennatula*.

Platyhelminthes: *Planaria*, *Fasciola hepatica*, *Fasciola* larval forms – Miracidium, Redia, Cercaria, *Echinococcus granulosus*, *Taenia solium*, *Schistosoma haematobium*

Nemathelminthes: *Ascaris*(Male & Female), *Drancunculus*, *Ancylostoma*, *Wuchereria*

Annelida: *Nereis*, *Aphrodite*, *Chaetopteurs*, *Hirudinaria*, Trochophore larva

Arthropoda: *Cancer*, *Palaemon*, *Scorpion*, *Scolopendra*, *Sacculina*, *Limulus*, *Peripatus*, Larvae - Nauplius, Mysis, Zoa, Mouth parts of male & female *Anopheles* and *Culex*, Mouthparts of Housefly and Butterfly.

Mollusca: *Chiton*, *Pila*, *Unio*, *Pteredo*, *Murex*, *Sepia*, *Loligo*, *Octopus*, *Nautilus*, Glochidium larva

Echinodermata: *Asterias*, *Ophiothrix*, *Echinus*, *Clypeaster*, *Cucumaria*, *Antedon*, Bipinnaria larva

Hemichordata: *Balanoglossus*, Tornaria larva

2. Dissections:

1. **Prawn:** Appendages, Digestive system, Nervous system, Mounting of Statocyst

2. **Insect Mouth Parts**

3. **Laboratory Record work shall be submitted at the time of practical examination**

20C 1308

B.Sc (Three Year) DEGREE EXAMINATION
End Semester Examination
First Semester
ZOOLOGY
PAPER – I: ANIMAL DIVERSITY: BIOLOGY OF NON CHORDATES

Time: 3 Hours

Max. Marks: 75

PART – A

I. Answer all objective questions (10x1=10Marks)

1. Which exhibit Protozoan bioluminescence among the following?
A. Amoeba
B. Stentor
C. Noctiluca
D. Entamoeba
2. Name the scientist who proposed Binomial nomenclature
A. Antonie Van Leeuwenhoek
B. Carl von Linnaeus
C. Karl Ernst Von Baer
D. Gregor Mendel
3. How many germ layers present in sponges
A. 1
B. 2
C. 3
D. 4
4. Common name of Obelia
A. Sea fur
B. Sea Potato
C. Sea fan
D. Sea Plum
5. Excretory cells in Fasciola hepatica
A. Germ cells
B. Cnidoblast cells
C. Flame cells
D. Gland cells
6. Scientific name of Blood fluke
A. Taenia solium
B. Trichinella spiralis
C. Dracunculus medinensis
D. Schistosoma haematobium
7. Why Arthropods are the most successful group of animals
A. Presence of appendages
B. Presence of hemocoel
C. Presence of exoskeleton
D. Presence of many larvae
8. Which one is the largest class of animals?
A. Arachnida
B. Insecta
C. Crustacean
D. Merostomata
9. What are the locomotory organs in star fish?
A. Tube Foot
B. Setae
C. Parapodia
D. Fins
10. Radula is present in which class of Molluscs
A. Polyplacophora
B. Gastropoda
C. Scaphopoda
D. Monoplacophora

II. Answer all fill in the blank questions (5x1=5Marks)

11. Sleeping sickness disease caused by_____
12. _____ animal called as dead man fingers.
13. Scientific name of Eye worm_____
14. _____ is the largest class in animal kingdom.
15. Respiratory trees are present in_____

Answer all short answers questions (5x2=10 Marks)

16. Write any two rules of binomial nomenclature.
17. What are the differences between polyp and medusa?
18. What is Polyembryony.
19. Why the phylum named as Arthropoda
20. What is the use of chystalline style in Molluscans.

PART – B

III. Answer ALL the following questions (5x10=50 marks)

Draw labeled diagrams where ever necessary

21. (a) Describe the Principles of Taxonomy with examples?
Or
(b) Write the structure of Elphidium?
22. (a) Describe various types of Polymorphism in Coelenterata?
Or
(b) Explain about Sycon type of canal system in sponges?
23. (a) Write about parasitic adaptations in Helminthes?
Or
(b) Elaborate the life history and pathogenicity of Fasciola hepatica?
24. (a) Enumerate the economic importance of Vermicompost.
Or
(b) Explain different types of metamorphosis in Arthropoda?
25. (a) Write about affinities of Balanoglossus?
Or
(b) Explain about pearl formation in Pelecypoda?

This is prepared by B.O.S team of Rayalaseema University

Any doubts and queries please contact:

S.No	BoS Role	Name of the Faculty	Name of the College	Contact No.
1	Chairperson	Smt.G.Siromani	PSC & KVSC Govt. Degree College, Nandyal	9493285924
2	Member	Dr.S.Gopal	PSC & KVSC Govt. Degree College, Nandyal	9441114487
3	Member	Dr.H.Rama Subba Reddy	Govt. Degree College, Koilkuntla	9441985286

RAYALASEEMA UNIVERSITY, KURNOOL

ZOOLOGY SYLLABUS FOR II SEMESTER – 2022-23

PAPER – II: ANIMAL DIVERSITY – BIOLOGY OF CHORDATES

HOURS: 60 (5X12)

Max. Marks: 100

Unit - I

- 1.1 General characters and classification of Chordata upto classes
- 1.2 Protochordata- Salient features of Cephalochordata , Affinities of Cephalochordata.
- 1.3 Salient features of Urochordata
- 1.4 Structure and life history of *Herdmania*
- 1.5 Retrogressive metamorphosis –Process and Significance

Unit - II

- 2.1 Cyclostomata, General characters, Comparison of *Petromyzon* and *Myxine*
- 2.2 Pisces : General characters of Fishes
- 2.3 *Scoliodon*: Digestive system, Respiratory system, Structure and function of Heart.
- 2.4 Migration in Fishes
- 2.5 Types of Scales
- 2.6 Dipnoi

Unit - III

- 3.1 General characters of Amphibia
- 3.2 Classification of Amphibia up to orders with examples.
- 3.3 *Rana hexadactyla*: Respiratory system, Structure and function of Heart, structure and functions of the Brain
- 3.4 Reptilia: General characters of Reptilia, Classification of Reptilia up to orders with examples
- 3.5 *Calotes*: Respiratory system, Structure and function of Heart, structure and function of Brain

Unit - IV

- 4.1 Aves General characters of Aves
- 4.2 *Columba livia*: Digestive system, Respiratory system, structure and function of Brain
- 4.3 Migration in Birds
- 4.4 Flight adaptation in birds

Unit - V

- 5.1 General characters of Mammalia
- 5.2 Classification of Mammalia up to sub - classes with examples
- 5.3 Dentition in mammals

RAYALASEEMA UNIVERSITY, KURNOOL

ZOOLOGY SYLLABUS FOR II SEMESTER – 2022-23

ZOOLOGY - PAPER - II

ANIMAL DIVERSITY - BIOLOGY OF CHORDATES

Periods: 24

PRACTICALS

Max. Marks: 50

OBSERVATION OF THE FOLLOWING SLIDES / SPOTTERS / MODELS

1. **Protochordata** : *Herdmania, Amphioxus, Amphioxus* T.S through pharynx.
2. **Cyclostomata** : *Petromyzon and Myxine*.
3. **Pisces** : *Pristis, Torpedo, Hippocoampus, Exocoetus, Echeneis, Labeo, Catla, Clarius, Channa, Anguilla*.
4. **Amphibia** : *Ichthyophis, Amblystoma, Axolotl larva, Hyla*,
5. **Reptilia**: *Draco, Chamaeleon, Uromastix, Testudo, Trionyx, Russels viper, Naja, Krait, Hydrophis, Crocodile*.
6. **Aves** : *Psittacula, Eudynamis, Bubo, Alcedo*.
7. **Mammalia**: *Ornithorhynchus, Pteropus, Funambulus*.

Dissections

1. *Scoliodon* IX and X, Cranial nerves
2. *Scoliodon* Brain
3. Mounting of fish scales

RAYALASEEMA UNIVERSITY, KURNOOL
ZOOLOGY SYLLABUS FOR III SEMESTER – 2022-23
PAPER – III: CELL BIOLOGY, GENETICS, MOLECULAR BIOLOGY AND EVOLUTION

HOURS: 60 (5X12)

Max. Marks: 100

Unit – I Cell Biology

- 1.1 Definition, history, prokaryotic and eukaryotic cells
- 1.2 Electron microscopic structure of animal cell.
- 1.3 Plasma membrane –Models and transport functions of plasma membrane.
- 1.4 Structure and functions of Golgi complex, Endoplasmic Reticulum and Lysosomes
- 1.5 Structure and functions of Ribosomes, Mitochondria, Nucleus, Chromosomes

(Note: 1. General pattern of study of each cell organelle – Discovery, Occurrence, Number, Origin, Structure and Functions with suitable diagrams)

2. Need not study cellular respiration under mitochondrial functions)

Unit – II Genetics - I

- 2.1 Mendel's work on transmission of traits
- 2.2 Gene Interaction – Incomplete Dominance, Co dominance, Lethal Genes
- 2.3 Multiple Alleles Blood group inheritance
- 2.4 Sex determination (Chromosomal, Genic Balance Theory of sex determination)
- 2.5 Sex linked inheritance (X-LINKED INHERITANCE WITH EXAMPLES
COLOUR BLINDNESS, HAEMOPHILIA AND MASCULAR DYSTROPHY.

Unit – III Genetics - II

- 3.1 Mutations & Mutagenesis
- 3.2 Chromosomal Disorders (Autosomal and Allosomal)
- 3.3 Human Genetics – Karyotyping

UNIT IV: Molecular Biology

- 4.1 Central Dogma of Molecular Biology
- 4.2 Basic concepts of -
 - a. DNA replication – Overview (Semi-conservative mechanism)
 - b. Transcription in prokaryotes – Initiation, Elongation and Termination, Post-transcriptional modifications (basics)
 - c. Translation – Initiation, Elongation and Termination
- 4.3 Gene Expression in prokaryotes (Lac Operon); Gene Expression in eukaryotes

Unit – V: Evolution

- 5.1 Origin of life
- 5.2 Theories of Evolution: Lamarckism, Darwinism,
- 5.3 Neo-Darwinism: Modern Synthetic Theory of Evolution, Hardy-Weinberg Equilibrium
- 5.4 Forces of Evolution: Isolating mechanisms, Genetic Drift, Natural Selection, Speciation

ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER
ZOOLOGY - PAPER - III
CYTOLOGY, GENETICS AND EVOLUTION

Periods: 24

Max. Marks: 50

I. Cytology

1. Preparation of temporary slides of Mitotic divisions with onion root tips
2. Observation of various stages of Mitosis and Meiosis with prepared slides
3. Mounting of salivary gland chromosomes of *Chironomous larva*

II. Genetics

1. Study of Mendelian inheritance using suitable examples
2. Study of linkage recombination, gene mapping using the data
3. Study of human karyotypes

III. Evolution

1. Study of fossil evidences
2. Study of homology and analogy from suitable specimens and pictures
3. Phylogeny of horse with pictures
4. Darwin's finches (pictures)
5. Visit to natural history museum and submission of report

C 3308

B.Sc (Three Year) DEGREE EXAMINATION

End Semester Examination

Third Semester

ZOOLOGY

PAPER – III: CELL BIOLOGY, GENETICS, MOLECULAR BIOLOGY AND EVOLUTION

Time : 3 Hours

Max.Marks : 70

PART – A

Answer any 5 questions (5x4=20Marks)

1.Genic balance Theory

జన్య తుల్య సిద్ధాంతము

2. Mitochondria

మైటోకాండ్రీయా

3. Endoplasmic Reticulam

ఎండోప్లాస్మిక్ రెటిక్యులమ్

4. Co daminance

సహ బహిర్గతత్వము

5. Germplasm Theory

బీజద్రవ్య సిద్ధాంతము

6. Speciation

జాతుల ఉత్పత్తి

7. Transcription

అనులేఖనము

8. Colour Blindness

వర్ణాంధత్వము

PART – B

Answer ALL the following questions (5x10=50 marks)
Draw labelled diagrams wherever necessary

9. (a) Discribe the various models of Plasma membrane?

ప్లాస్మాత్వచము యొక్క వివిధ నమూనాలను వివరించండి?

Or

(b) Write the structure and functions of Nucleus?

కేంద్రకము యొక్క నిర్మాణము మరియు విధులను తెల్పండి?

10. (a) Discribe the process of Translation in Eukaryotes?

నిజ కేంద్రక జీవులలో అనువాదము జరిగే విధానాన్ని విశదీకరించండి?

Or

(b) Explain gene expression in prokaryotes by using Lac operan?

లాక్ ఒపెరాన్ ద్వారా కేంద్రక పూర్వ జీవులలో నియంత్రణ విధానాన్ని వివరించండి?

11. (a) Write the principles in Darwinism?

డార్విన్ సిద్ధాంతంలోని సూత్రాలను రాయండి?

Or

(b) Write about the Hardy-Weinberg Equilibrium in detail

హార్డి- వీన్ బర్గ్ సమతాస్థితి గురించి వివరించండి?

12. (a) Enumerate in detail about the sexlinked inheritance.

లింగ సంబంధ అనువంశికత గురించి వివరంగా వ్రాయండి?

Or

(b) What is multiple alleles? Explain with blood group inheritance?

బహుళ యుగ్మవికల్పకాలు అనగా నేమి? రక్తవర్గాల అనువంశికతను ఉదాహరణగా తీసుకొని వివరించండి?

13. (a) What are Mutations? Explain defferent types of mutations?

ఉత్పరివర్తనాలు అనగా నేమి? వివిధ రకాల ఉత్పరివర్తనాలను గురించి రాయండి?

Or

(b) Expalain Human karyotype and the Significance?

మానవ కారియోటైప్ గురించి వివరించి, దాని ప్రాముఖ్యతను తెల్పండి?

This is prepared by B.O.S team of Rayalaseema University

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1	Chairperson	Smt.G.Siromani	PSC & KVSC Govt. Degree College, Nandyal	9493285924
2	Member	Dr.S.Gopal	PSC & KVSC Govt. Degree College, Nandyal	9441114487
3	Member	Dr.H.Rama Subba Reddy	Govt. Degree College, Koilkuntla	9441985286

RAYALASEEMA UNIVERSITY
ZOOLOGY SYLLABUS FOR IV SEMESTER - 2022-23
PAPER - IV: ANIMAL PHYSIOLOGY, CELLULAR METABOLISM AND EMBRYOLOGY

HOURS: 60 (5X12)

Max. Marks:100

UNIT I Animal Physiology - I

- 1.1 Process of digestion and assimilation
- 1.2 Respiration - Pulmonary ventilation, transport of oxygen and CO₂
- 1.3 Circulation - Structure and functioning of heart, Cardiac cycle
- 1.4 Excretion - Structure and functions of kidney urine formation, counter current Mechanism

UNIT II Animal Physiology - II

- 2.1 Nerve impulse transmission - Resting membrane potential, origin and propagation of action Potentials along myelinated and non-myelinated nerve fibers
- 2.2 Muscle contraction- Ultra structure of muscle, molecular and chemical basis of muscle contraction
- 2.3 Endocrine glands - Structure, functions of hormones of pituitary and pancreas

UNIT III Cellular Metabolism - I (Biomolecules)

- 3.1 Carbohydrates - Classification of carbohydrates. Structure of glucose
- 3.2 Proteins - Classification of proteins. General properties of amino acids
- 3.3 Lipids - Classification of lipids

UNIT IV Cellular Metabolism - II

- 4.1 Carbohydrate Metabolism - Glycolysis, Krebs cycle, Glycogen metabolism, Gluconeogenesis
- 4.2 Lipid Metabolism - β -oxidation of palmitic acid
- 4.3 Protein metabolism-Transamination, Deamination and Urea Cycle

Unit - V Embryology

- 5.1 Gametogenesis
- 5.2 Fertilization
- 5.3 Types of eggs
- 5.4 Types of cleavages

PRACTICAL SYLLABUS

Periods: 24

Max. Marks: 50

I. ANIMAL PHYSIOLOGY

1. Qualitative tests for identification of carbohydrates, proteins and fats
2. Study of activity of salivary amylase under optimum conditions
3. T.S. of duodenum, liver, lung, kidney, spinal cord, bone and cartilage

II. CELLULAR METABOLISM

1. Estimation of total proteins in given solutions by Lowry's method.
2. Estimation of total carbohydrate by Anthrone method.
3. Qualitative tests for identification of ammonia, urea and uric acid
4. Protocol for Isolation of DNA in animal cells

III. EMBRYOLOGY

1. Study of T.S. of testis, ovary of a mammal
2. Study of different stages of cleavages (2, 4, 8 cell stages)

RAYALASEEMA UNIVERSITY
ZOOLOGY SYLLABUS FOR SEMESTER - IV -2022-23
PAPER - 5: IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY

HOURS: 60 (5X12)

Marks: 100

Unit - I Immunology - I (Overview of Immune system)

- 1.1 Introduction to basic concepts in Immunology
- 1.2 Innate and adaptive immunity,
- 1.3 Cells of immune system
- 1.4 Organs of immune system

Unit - II Immunology - II (Antigens, Antibodies, MHC and Hypersensitivity)

- 2.1 Antigens: Basic properties of antigens, B and T cell epitopes, haptens and adjuvants; Factors influencing immunogenicity
- 2.2 Antibodies: Structure of antibody, Classes and functions of antibodies
- 2.3 Hypersensitivity – Classification and Types

Unit - III Techniques

- 3.1 Animal Cell, Tissue and Organ culture media: Natural and Synthetic media,
- 3.2 Cell cultures: Establishment of cell culture (primary culture, secondary culture, types of cell lines; Protocols for Primary Cell Culture); Organ culture; Cryopreservation of cultures
- 3.3 Stem cells: Types of stem cells and applications
- 3.4 Hybridoma Technology: Production & applications of Monoclonal antibodies (mAb)

Unit-IV Applications of Animal Biotechnology

- 4.1 Genetic Engineering: Basic concept, Vectors, Restriction Endonucleases and Recombinant DNA technology
- 4.2 Gene delivery : Microinjection, electroporation, biolistic method (gene gun), liposome and viral-mediated gene delivery
- 4.3 Manipulation of reproduction in animals: Artificial Insemination, *In vitro* fertilization, super ovulation, Embryo transfer, Embryo cloning

Unit - V

- 5.1. PCR: Basics of PCR.
- 5.2 DNA Sequencing: Sanger's method of DNA sequencing- traditional and automated sequencing
- 5.3 Fermentation: Different types of Fermentation and Downstream processing; Agriculture:

PRACTICAL SYLLABUS

I. IMMUNOLOGY

1. Demonstration of lymphoid organs (as per UGC guidelines)
2. Histological study of spleen, thymus and lymph nodes (through prepared slides)
3. Blood group determination
4. Demonstration of a. ELISA b. Immunoelectrophoresis

II. Animal biotechnology

1. DNA quantification using DPA Method.
2. Techniques: Western Blot, Southern Hybridization, DNA Fingerprinting
3. Separation, Purification of biological compounds by paper, Thin-layer and Column chromatography
4. Cleaning and sterilization of glass and plastic wares for cell culture.
5. Preparation of culture media.

RAYALASEEMA UNIVERSITY, KURNOOL

Zoology Syllabus for Semester -V- 2022-23

REVISED UG SYLLABUS UNDER

CBCS

Semester-V

(To choose one pair from the four alternate pairs of SECs)

UnivCode	Course Number	Name of Course
	6A	SUSTAINABLE AQUACULTUREMANAGEMENT
	7A	POST HARVEST TECHNOLOGYOF FISH AND FISHERIES

OR

	6B	LIVE STOCK MANAGEMENT-I (BIOLOGY OF DAIRY ANIMALS)
	7B	LIVE STOCK MANAGEMENT -II(DAIRY PRODUCTION AND MANAGEMENT)

OR

	6C	POULTRY MANAGEMENT- I(POULTRY FARMING)
	7C	POULTRY MANAGEMENT- II (POULTRY PRODUCTION AND MANGEMENT)

OR

	6D	SERI CULTURE -I
	7D	SERI CULTURE -II

Note: For Semester-V, for the domain subject Zoology, any one of the four pairs of SECs shall be chosen as courses 6 and 7, i.e., 6A & 7A or 6B & 7B or 6C & 7C or 6D & 7D. The pair shall not be broken (ABCD allotment is random, not on any priority basis).

RAYALASEEMA UNIVERSITY, KURNOOL

Zoology Syllabus for Semester -V- 2022-23

Course: 6 A: **SUSTAINABLE AQUACULTURE MANAGEMENT**
Teaching Hours: 60. Max. Marks: 100

Unit: 1

- 1.1 Present status of Aquaculture – Global and National scenario
- 1.2 Major cultivable species for aquaculture: freshwater, brackish water and marine.
- 1.3 Traditional, extensive, modified extensive, semi-intensive and intensive cultures of fish and shrimp.
- 1.4 Design and construction of fish and shrimp farms

Unit: 2

- 2.1 Functional classification of ponds – head pond, hatchery, nursery ponds
- 2.2 Functional classification of ponds -rearing, production, stocking and quarantine ponds
- 2.3 Need of fertilizer and manure application in culture ponds
- 2.4 Physio-chemical conditions of soil and water optimum for culture (Temperature, depth, turbidity, light, water, PH, BOD, CO₂ and nutrients)

Unit: 3

- 3.1. Induced breeding in fishes
- 3.2. Culture of Indian major carps: Pre-stocking management (Dewatering, drying, ploughing/desilting; Predators, weeds and algal blooms and their control, Liming and fertilization)
- 3.3. Culture of Indian major carps - Stocking management
- 3.4. Culture of Indian major carps - post-stocking management

Unit: 4

- 4.1 Commercial importance of shrimp & prawn
- 4.2 *Macrobrachium rosenbergii*- biology, seed production.
- 4.3 Culture of *L. vannamei* – hatchery technology and culture practices

4.4 Mixed culture of fish and prawns

Unit: 5

5.1 Viral diseases of Fin Fish & shell fish

5.2 Fungal diseases of Fin & Shell fish

5.3 Bacterial diseases of Finfish & Shell fish

5.4 Prophylaxis in Aquaculture.

Course: 6 A: SUSTAINABLE AQUACULTURE MANAGEMENT PRACTICAL SYLLABUS (30hrs) (Max.50Marks)

1. Fresh water Cultivable species any (Fin & Shell Fish Specimens – Observation of morphological characters by observation and drawings)-5
2. Brackish water cultivable species (Fin & Shell fish- Specimens- Observation of Morphological Character by observing drawing) -5
3. Hands on training on the use of kits for determination of water quality in aquaculture (DO, Salinity, pH, Turbidity- Testing kits to be used for the estimation of various parameters/ Standard procedure can be demonstrated for the same)
4. Demonstration of Hypophysation(Procedure of hypophysation to be demonstrated in the practical lab with any edible fish as model)
5. Viral diseases of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of viral pathogens in fin/ shell fish – one edible specimen can be used for observation of same in the laboratory)
6. Bacterial diseases of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of Bacterial pathogens in fin/ shell fish – One edible specimen can be used for observation of same in the laboratory)
7. Fungal diseases of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of Bacterial pathogens in fin/ shell fish – One edible specimen can be used for observation of same in the laboratory)

Course 7 A: POSTHARVEST TECHNOLOGY OF FISH AND FISHERIES
Teaching Hours: 60. Max. Marks: 100

Unit – I Handling and Principles of fish Preservation

- 1.1 Handling of fresh fish, storage and transport of fresh fish, post mortem changes (rigor mortis and spoilage), spoilage in marine fish and freshwater fish.
- 1.2 Principles of preservation – cleaning, lowering of temperature, rising of temperature, denudation, use of salt, use of fish preservatives, exposure to low radiation of gamma rays.

Unit – II Methods of fish Preservation

- 2.1 Traditional methods - sun drying, salt curing, pickling and smoking.
- 2.2. Advanced methods – chilling or icing, refrigerated sea water, freezing, canning, irradiation and Accelerated Freeze drying (AFD).

Unit – III Processing and preservation of fish and fish by-products

- 3.1 Fish products – fish minced meat, fish meal, fish oil, fish liquid (ensilage), fish protein concentrate, fish chowder, fish cake, fish sauce, fish salads, fish powder, pet food from trash fish, fish manure.
- 3.2 Fish by-products – fish glue, Using glass, chitosan, pearl essence, shark fins, fish Leather and fish maws.

Unit – IV Sanitation and Quality control

- 4.1 Sanitation in processing plants - Environmental hygiene and Personal hygiene in processing plants.
- 4.2 Quality Control of fish and fishery products – pre-processing control, control during processing and control after processing.

Unit – V Quality Assurance, Management and Certification

- 5.1. Seafood Quality Assurance and Systems: Good Manufacturing Practices (GMPs); Good Laboratory Practices (GLPs); Standard Operating Procedures (SOPs); Concept of Hazard Analysis and Critical Control Points (HACCP) in seafood safety.
- 5.2 National and International standards – ISO 9000: 2000 Series of Quality Assurance System, *Codex Alimentarius*.

Course 7 A: POSTHARVEST TECHNOLOGY OF FISH AND FISHERIES
PRACICAL SYLLABUS

1. Evaluation of fish/ fishery products for organoleptic, chemical and microbial quality.
2. Preparation of dried, cured and fermented fish products
For detailed procedure method visit sites:
3. Examination of salt, protein, moisture in dried / cured products
4. Examination of spoilage of dried / cured fish products, marinades, pickles, sauce.
5. Preparation of isinglass, collagen and chitosan from shrimp and crab shell.
6. Developing flow charts and exercises in identification of hazards – preparation of hazard analysis worksheet
7. Corrective action procedures in processing of fish- flow chart- work sheet preparation

**Course6 B: LIVE STOCK MANAGEMENT-I
(BIOLOGY OF DAIRY ANIMALS)**

Teaching Hours: 60.

Max. Marks: 100

Unit 1: Livestock census; Breeds of Dairy cattle, Buffaloes and Goats. Indigenous, Exotic and Crossbred Cattle breeds

Unit 2: Anatomy of Udder; Development of udder; Lactogenesis and Galactopoiesis; Letdown of milk.

Unit 3: Artificial insemination; Oestrous cycle; Symptoms of heat in cows and buffaloes. Conception, Pregnancy diagnosis in cattle. Multi ovulation and embryo transfer technique. Cloning.

Unit4: Economic traits of Dairy cattle. Methods of selection of dairy animals.

Unit5: Systems of Dairy cattle breeding. Inbreeding, out breeding, Cross breeding, Grading up. Breeding systems (Cross breeding of cattle and Grading up of buffaloes).

LIVE STOCK MANAGEMENT-I

Practical (Laboratory) Syllabus: (30hrs) (Max.50Marks)

1. Points dairy cow. (Explanation with observation of charts- Model evaluation to be performed by the student in the laboratory)
2. Identification of different breeds of dairy cattle and buffaloes.(Observation of Charts of breeds in the laboratory- at least 3 breeds should be identified by the students in their locality with video, photo)
3. Male and female reproductive systems of cow – Model/ Chart (Student has to draw a labeled diagram of the male and female reproductive systems of cow – acquire skill to identify the parts).
4. Symptoms of heat in cow (Study and Understanding the physiological symptoms during heat).
5. Artificial in semi nation (Flow chart of implements – Procedure- precautions)
6. Pregnancy diagnosis in cattle.
7. Study comparative merits of cows and buffaloes; zebu and cross bred cows (Examination of merits)

Course 7B: LIVE STOCK MANAGEMENT -II (DAIRY PRODUCTION AND MANAGEMENT)

Teaching Hours: 60.

Max. Marks: 100

Unit1: Systems of Housing of Dairy cattle- Loose Housing and Conventional Dairy Barns. Drawing of layouts for dairy cattle dwellings; Criteria for selecting site for establishing Dairy farm buildings; Water requirement of dairy animals.

Unit2: Management of different classes of Dairy animals- Milk producing animals, pregnant animals dry animals, heifers and calves. Management practices for Dairy farm; Identification, Dehorning, Castration, Deworming, Vaccination, Disinfection, and Milking.

Unit 3: (a) Pasteurization of milk: Definition, objects of pasteurization, objections to pasteurization, Principles of heat exchange. Methods of pasteurization: LTLT, HTST and Uperization.

(b)Sterilization of milk. Homogenization: Factors influencing homogenization

Unit 4: Market milk: Toned milk, double toned milk, Reconstituted milk, Standardized milk and full cream milk–Standards and methods of manufacture.

Unit 5: Cream: Types of cream, composition, methods of cream separation, gravity and centrifugal methods, types of cream separators, factors affecting fat losses in skim milk and fat percentage in cream.

Course 7 B: LIVE STOCK MANAGEMENT -II
PRACTICAL SYLLABUS
(DAIRY PRODUCTION AND MANAGEMENT) (30hrs) (Max.50Marks)

1. Dairy Farm layout (In the laboratory student has to sketch a dairy farm with all its components)
2. Identification of cows (students have to identify the breeds of cows from the images/charts – have to identify any two breeds in the vicinity of the college/ their locality).
3. Dehorning of calves : (Method - protocol- precautions)
4. Castration of bulls (Method – Apparatus- Time-importance)
5. Deworming of dairy cattle : (Schedule – method- benefits)
6. Pasteurization of milk (Batch Method- procedure- Observation)
7. Sterilization of milk (In bottle sterilization- procedure – protocol)
8. Cream separation (By gravity method- procedure- hands on experiment)

Course6 C: POULTRY MANAGEMENT- I (POULTRY FARMING)
Teaching Hours: 60. Max. Marks: 100

Unit 1 Indian poultry Industry

- 1.1 Importance of poultry farming and poultry development in India.
- 1.2 Present status and future prospectus of poultry Industry
- 1.3 Classification of poultry based on genetics Utility

Unit -2 Scientific Poultry Keeping

- 2.1 Modern breeds of Chicken
- 2.2 Present day egg production lines- meat production lines
- 2.3 Mini breeds- dwarfism in mini-Leghorns

Unit-3Diversified Poultry

3.1 Ducks and Geese-classification- rearing system-classification-advantages

3.2 Guinea fowls - guinea fowl farming in India-Production-varieties

3.3 Emu-rearing- Economical aspects-commercial products

Unit-4Desi Chickens:

4.1 Indigenous breeds and economical aspects of desi chicken

4.2 Indigenous breeds-Aseel-Chittagong-Kadakhnath-Bursa

4.3 Improved varieties in India – Giriraja-Vanaraja-Girirani-Kalinga brown, Gramapriya, Swarnandhra

Unit -5 Breeds from Central Avian Research Institute – Izatnagar

5.1 CARI Nirbheek - CARI- Shyama-HITCARI (Naked Neck Cross)

5.2 CARI- Priya Layer, CARI- Sonali Layer,

5.3 CARIBRO-VISHAL, CARI-RAINBRO,

5.4 Nandanam chicken-I, Nandanam Chicken-II, Nandanm-Quail

**Course6 C: POULTRY MANAGEMENT- I (POULTRY FARMING)
PRACTICAL SYLLABUS**

V. Practical(Laboratory) Syllabus:(30hrs) (Max.50Marks)

1. Different types of Poultry rearing (Students has to observe and draw the different types of poultry rearing systems)
2. Different types of poultry Housing - Models / Images/charts
3. Different layer breeds images/charts/ Models (Observation of characters)
4. Types of broilers images/charts/ Models (Identification of important Characters)
5. CARI breeds characters –images/charts
6. Nandanam breeds- images/charts (Identification of characters)

Course 7 C: POULTRY MANAGEMENT -II
(POULTRY PRODUCTION AND MANGEMENT)

Teaching Hours: 60.

Max. Marks: 100

Unit-1 HEALTH CARE

1.1 Common poultry diseases: bacterial, viral, fungal, parasitic and nutritional deficiencies.

1.2 Vaccination schedule for commercial layers and broilers: factors that govern vaccination schedule; vaccination principles type, methods, pre and post vaccination care.

1.3 Disinfection: Types of disinfectants; mode of action; recommended procedure; precaution and handling.

Unit-2 ECONOMICS

2.1 Economics of layer and broiler production

2.2 Projects reports in different systems of rearing for layer & broilers.

2.3 Feasibility studies on poultry rearing- in context of small units and their profitability.

2.4 Export/import of poultry and poultry products.

Unit-3 BREEDER FLOCK MANAGEMENT

3.1 Layer and broiler breeder flock management housing & space requirements.

3.2 Different stage of management during life cycle; Light management during growing and laying period, Artificial insemination.

3.3 Feeding: Feed restriction, separate male feeding. Nutrient requirement of layer and broiler breeders of different age groups.

Unit-4 BREEDER HEALTHCARE

4.1 Vaccination of breeder flock; difference between vaccination schedule of broilers and commercial birds.

4.2 Common diseases of breeders (Infectious and metabolic disorders)-prevention.

4.3 Fertility disorder- etiology, diagnosis and corrective measures. Selection and culling of breeder flocks

Unit-5 HATCHERY PRACTICES

5.1 Management principles of incubation.

5.2 Factors affecting fertility and hatchability. Selection, care and incubation of hatching eggs. Fumigation; sanitation and hatchery hygiene.

5.3 Importance of hatchery records, break even analysis of unhatched eggs.

5.4 Computer applications for hatchery management

**Course 7C: POULTRY MANAGEMENT –II- PRACTICAL SYLLLABUS
(POULTRY PRODUCTION AND MANGEMENT) (30hrs) (Max.50Marks)**

1. Poultry Viral diseases – Observation of histopathological slides
2. Poultry Fungal Diseases- Observation of histopathological slides
3. Poultry Bacterial Diseases-Observation of histopathological slides
4. Feasibility study of Poultry establishment: (Preparation of feasibility study report with given parameters)
5. Rearing of Layers – (Preparation of Flow chart
6. Rearing of broiler- Flow chart
7. Hatchery records- Model study/analysis- Report with modified data

**Course6 D: SERI CULTURE -I
(BIOLOGY AND CULTIVATION OF MULBERRY)**

Teaching Hours: 60.

Max. Marks: 100

Unit-1A general introduction to Sericulture

- 1.1 Sericulture map of India: Components of Sericulture.
- 1.2 Textile fibers: Types- natural and synthetic fibers- types of silk produced in India; Importance of mulberry silk:
- 1.3 Sericulture organization in India; role of state departments of Sericulture, Central Silk Board and NGOs in Sericulture development

Unit-2Sericultural Botany.

- 2.1 Taxonomy of mulberry and food plants of silkworms: Study of salient features of the families-Marceau.
- 2.2 Morphology of mulberry: different varieties of mulberry.
- 2.3 Anatomy of mulberry: internal structure of stem, root and leaf; secondary growth in root and stem.

Unit 3 Floral biology of mulberry

3.1 Floral biology of mulberry: Sexual behavior, different types of anthers and ovule in mulberry; micro- and megaspore genesis.

3.2 Development of male and female gametophytes; pollination, fertilization

3.3 Development of endosperm, embryo and seed; polyembryony and parthenocarpy in mulberry.

Unit-4 Silkworm Biology.

4.1 Characteristic features of the order Lepidoptera; detailed study of the families- Saturnidae and Bombycid. Classification of sericigenous insects.

4.2 Classification of silkworms based on moultnism, voltinism and geographical distribution; popular silkworm breeds and hybrids of Karnataka; their economic traits

Unit-5 Morphology and anatomy of reproductive systems of silk moth.

5.1 Life cycle of *Bombyx Mori*; morphology of egg, larva, pupa and adult

Course: 6 D: SERI CULTURE -I **PRACTICAL SYLLABUS** (30hrs) (Max.50Marks)

1. Sericulture map of India and Karnataka.
2. Preparation of histograms and pie charts on:
3. Production of textile fibers in India.
4. Pie chart on mulberry and non-mulberry silk production in India.
5. Life cycle of *Bombyx mori*- Morphology of egg, larva, pupa and adult of *Bombyx mori*.
6. Sex separation in larva, pupa and adult of the silkworm *Bombyx mori*.
7. Dissection and display of: Digestive system of larva. Silk glands.

Course: 7 D: **SERICULTURE -II**
(BIOLOGY AND REARING OF SILKWORM)

Teaching Hours: 60.

Max. Marks: 100

Unit-1

1.1 Rearing house: Location, orientation, plan and utilities; model rearing house; low-cost rearing house.

1.2 Rearing appliances-shelf and shoot rearing; requirements of rearing appliances (per unit rearing of 100dfis).

Unit-2

2.1 Disinfection of rearing house and rearing appliances; (disinfectants formalin, bleaching powder, chlorine dioxide, slaked lime and iodine compounds);

2.2 Rearing and personal hygiene.

Unit-3

3.1 Incubation- definition, requirement of environmental conditions, incubation devices; identification of stages of development; black boxing and its importance.

3.2 Chawki rearing: Preparation; brushing and its methods; types of chawki rearing - traditional and improved method; optimum environmental conditions; methods and frequency of feeding; methods of bed cleaning; spacing; moulting and care during moult.

Unit -4

4.1 Late age silkworm rearing: Methods; optimum environmental conditions; feeding quantity and frequency; methods of bed cleaning; spacing; moulting and care during moult.

4.2. Identification of spinning larva; spinning; mounting and mounting density; types of mountages, their advantages and disadvantages; environmental requirements during spinning.

Unit -5

5.1 Harvesting: Time of harvesting; sorting, storage/ preservation

5.2 Packaging and transport of cocoons; leaf-cocoon ratio; Maintenance of rearing records.

Course 7 -D: SERICULTURE –II-PRACTICAL SYLLABUS
(BIOLOGY AND REARING OF SILKWORM) (30hrs) (Max.50Marks)

1. Morphology and structure of silkworm egg, fertilization, Diapause development
2. Rearing house: Location, orientation, plan and utilities; model rearing house; low-cost rearing house.
3. Disinfection of rearing house and rearing appliances;
4. Incubation of silkworm eggs- Methods; black boxing; maintenance of temperature and humidity; Brushing: Methods; chawki rearing; use of paraffin paper and blue polythene sheet.
5. Bed cleaning: use of bed cleaning net and disposal of bed refuses and silkworm litter.
6. Moulting: Identification of moulting larva, care during moulting; mounting and mounting density; harvesting of cocoons; assessment of cocoons; types of mountages;
7. Study the mulberry leaf by graph paper method : (for calculating the leaf area)

**This syllabus is prepared by B.O.S team of
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Any doubts and queries please contact:

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