

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Zoology

Semester: I

Course Title: Animal Diversity- Biology of Non- Chordates

Course Code: 20ZLCCAN13

Total Hours: 45hrs

LTP: 300

Credits: 3

Objectives:

- To understand the amazing diversity of living forms from simple to complex one.
- To enlightens how each group of organisms arose and how did they establish themselves in the environment with their special Characteristics.
- To identify the differences and similarities between organisms on the basis of their morphology and anatomy which led to their grouping into taxa, clades and working systems.

Course outcomes

CO1: Understand the taxonomic position of non-chordates in animal Kingdom.

CO2: Identify and classify the invertebrates up to class level based on their unique characters.

CO3: Appreciate the process of evolution from phylum Protozoa to Phylum Echinodermata.

CO4: Comprehend the advanced phyla Annelida to Hemichordate on the basis of life processes.

CO5: Develop skills in identification of the beneficial and non-beneficial organisms, culturing methods of beneficial organisms (**Vermiculture, Sericulture, shellfish cultures**) and get employment.

UNIT I:**9 hours**

Principles of Taxonomy – Binomial nomenclature – Rules of nomenclature.

Whittaker's five kingdom concept and classification of Animal Kingdom.

Phylum Protozoa: General characters, Locomotory organelles and locomotion in *Protozoa*. Type study: *Elphidium*

Phylum Porifera: General characters. Type study: **Sycon**
Skeleton and Canal system in sponges.

Unit II**9 hours**

Phylum Cnidaria: General characters Type study: *Aurelia* (External characters, Structure of Polyp & Medusa): Polymorphism in *Hydrozoa*, Corals and Coral reefs.

Phylum: Platyhelminthes: General characters, parasitic adaptation, Life cycle of *Fasciola hepatica*

Phylum Nematelminthes: General characters, Life cycle and pathogenicity of *Ascaris lumbricoides*

Unit – III**9 hours**

Phylum Annelida: General characters, Evolution of Coelom and Coelomoducts

Phylum Arthropoda: General characters, Vision and respiration in Arthropoda

Metamorphosis in Insects, Social Life in Bees and Termites

Phylum Mollusca

General characters, Pearl formation in Pelecypoda, Sense organs in Mollusca

Unit – IV**9 hours**

Phylum Echinodermata:

General characters, Type study –star fish, Water vascular system in star fish, larval forms of Echinodermata

Phylum Hemichordata: General characters *Balanoglossus* - Structure

Affinities with chordates and non-chordates

Unit- V**Skill Enhancement topics****9****hours**

Vermiculture: Manure making- Scope & significance of Vermiculture, Earthworm species, Raw materials, nutrients and Economic importance.

Sericulture: Scope & significance of sericulture, types of moth, types of silk and silk production.

Prawn culture: (*Macrobrachium scampi*) and **Crab culture:** Green mud crab. **Mussel culture** **Case studies. Field trip.**

Prescribed Books:

1. Text book of Zoology – R. L. Kotpal
2. Invertebrate Zoology – E. L. Jordan & P. S. Verma
3. Text book of Invertebrates – H. S. Bhamrah & Co.
4. A text book of Invertebrates – S. Iyer.
5. R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer,
6. The Invertebrates: A New Synthesis, III Edition, Blackwell Science.
7. Barrington, E.J.W. (1979). Invertebrate Structure and Functions. II Edition, E.L.B.S. and Nelson

Reference Text Books:

1. Barnes, R. S. K.; Calow, P.; Olive, P. J. W.; Golding, D. W.; Spicer, J. I. (2002) The Invertebrates: a Synthesis, Blackwell Publishing.
2. Hickman, C.; Roberts, L.S.; Keen, S.L.; Larson, A. and Eisenhower, D. (2018) Animal Diversity, McGraw-Hill.
3. Barrington, E.J.W. (1979) Invertebrate Structure and Functions.II Edition.E.L.B.S. and Nelson.
4. Boradale, L.A. and Potts, E.A. (1961) Invertebrates: A Manual for the use of Students. Asia Publishing Home.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
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SYLLABUS

Subject: Zoology

Semester: I

Course Title: Study of Non-Chordates-Practical

Credits: 2

Course code: 20ZLP1SN12

Total Hours: 30 Hrs

Max. Marks: 50

LTP:002

Objectives:

- To understand the importance of preservation of museum specimens.
- To prepare laboratory record and album of different taxa specimens.

Course Outcomes:

CO1• Identify animals based on special identifying characters

CO2• Understand different organ systems through demo or virtual dissections

CO3• Maintain a neat, labeled record of identified museum specimens

SYLLABUS: Study of museum slides / specimens / models (Classification of animals up to orders)

Protozoa: Amoeba, Paramecium, Paramecium Binary fission and Conjugation, Vorticella, *Entamoeba histolytica*, *Plasmodium vivax*

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

Cnidaria: Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatulula

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

Nemathelminthes: Ascaris(Male & Female), Dracunculus, Ancylostoma, Wuchereria

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

Arthropoda: Cancer, Palaemon, Scorpion, Scolopendra, Sacculina, Limulus, Peripatus, Larvae - Nauplius, Mysis, Zoea, 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:

Prawn: Appendages, Nervous system, Mounting of Statocyst

3. Laboratory Record work shall be submitted

Reference Manuals:

1. Practical Zoology- Invertebrates S.S. Lal

2. Practical Zoology - Invertebrates P.S. Verma

3. Practical Zoology - Invertebrates K.P. Kurl

4. Ruppert and Barnes (2006) Invertebrate Zoology, 8th Edition, Holt Saunders International Edition

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
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SYLLABUS

Subject: Zoology

Semester: II

Course Title: Animal Diversity-Biology of Chordates

Course Code:20ZLCCAC23

Credits: 3

Total Hours: 45

LTP:300

Objectives:

- To understand the amazing diversity of living forms from simple to complex one with their special characteristics.
- To identify the differences and similarities between organisms on the basis of their morphology and anatomy which led to their grouping into taxa, clades and working systems.

Course outcomes:

CO1:The difference between various species and the evolution of complexity in each system.

CO2:Critical understanding how endoskeleton changed from a notochord to vertebral column.

CO3:Examine the diversity and Physiological activities of higher animals.

CO4: Economic importance of commercially important animals and their rearing methodologies

CO5:Aquaculture and acquire skill through Fishery by-products and preservation methods.

Unit – I**9 hrs**

General characters and classification of Chordata upto classes
Protochordata- Salient features of Cephalochordata, Affinities of Cephalochordata, Salient features of Urochordata, Structure and life history of Herdmania , Retrogressive metamorphosis –Process and Significance

Unit - II**9 hrs**

Cyclostomata, General characters, Comparison of Petromyzon and Myxine , Pisces : General characters of Fishes, Scoliodon: External features, Digestive system, Respiratory system, Structure and function of Heart, Structure and functions of the Brain. Migration in Fishes
Types of Scales, Dipnoi

Unit – III**9 hrs**

General characters of Amphibia , Classification of Amphibia up to orders with examples. Rana hexadactyla: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and functions of the Brain.

Reptilia: General characters of Reptilia, Classification of Reptilia upto orders with examples Calotes: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and function of Brain. Identification of Poisonous snakes and Skulls in reptiles

Unit - IV**9hrs**

Aves: General characters of Aves, Columba livia: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and function of Brain , Migration in Birds, Flight adaptation in bird.

Mammalia: General characters of Mammalia , Classification of Mammalia upto sub - classes with examples, Comparison of Prototherians, Metatherians and Eutherians, Dentition in mammals

Unit – V Skill Enhancement**9hrs**

Fish preservation: Traditional methods – Sun drying, Salt Curing, Pickeling and smoking. Advanced methods chilling or icing, refrigerated sea water, Freezing, canning and irradiation.

Processing and preservation of Fish bye-products: Fish meal, fish oil, fish liquid, fish protein, fish chowder and cake, fish sauce, fish salad, fish manure & Scales

Fish by-products: Fish glue, Isinglass, chitosan, shark fins, fish leather and pearl essence.

Visiting local fish market.

Prescribed Books:

1. R.L.Kotpal, 2000. Modern textbook of zoology, Vertebrates. (Rastogi Publ., Meerut). 632 pages.
2. Chordate Zoology, Arumugam, N. Vol. 2. Saras Publication. 278 pages. 200 figs.

Reference Books

- J.Z. Young, 2006. The life of vertebrates. (The Oxford University Press, New Delhi). 646 pages. Reprinted.
- A.J. Marshall, 1995. Textbook of zoology, Vertebrates. (The McMillan Press Ltd., UK). 852 pages. (Revised edition of Parker & Haswell, 1961).
- M. Ekambaranatha Ayyar, 1973. A manual of zoology. Part II. (S. Viswanathan Pvt. Ltd., Madras).
- P.S. Dhami & J.K. Dhami, 1981. Chordate zoology. (R. Chand & Co.). 550 pages.
- E.L. Jordan & P.S. Verma, 1998. Chordate zoology. (S. Chand & Co.). 1092 pages

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA – 8
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SYLLABUS

Subject: Zoology

Semester: II

Course Title: Study of Chordates -Practical

Course Code: 20ZLP2SC22

Credits:2

LTP:002

Objectives:

To understand internal anatomy of animals through demo or virtual dissections, thus directing the student for "empathy towards the fellow living beings"

- To maintain a neat, labeled record of identified museum specimens

Course Outcomes:

CO1: Understand the taxidermic and other methods of preservation of chordates

CO2: Identify chordates based on special identifying characters and classification.

CO3: Draw internal anatomy of animals through demo or virtual dissections pics.

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, Hippocampus ,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 - V and VIII, IX and X Cranial nerves
- 2 Scoliodon Brain mounting
3. Mounting of fish scales-Placoid

Note: 1. Dissections are to be demonstrated only by the faculty or virtual.

Reference Books:

1. S.S.Lal, Practical Zoology – Vertebrata
2. P.S.Verma, A manual of Practical Zoology – Chordata

**MARIS STELLA COLLEGE (AUTONOMOUS),VIJAYAWADA -8
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SYLLABUS

Subject: Zoology

Semester: III

Course Title: Cell & Molecular Biology, Genetics & Evolution Credits:3

Course Code :20ZLCCCG33

No of hrs: 45

LTP 300

Objectives:

- To describe the ultrastructure of the cell and cell organelles at molecular level and to differentiate the organisms by their cell structure.
- To help students to understand the inheritance of Gene, their interaction and gain knowledge on various types of inheritance patterns existing in animals.

Course Outcomes:

CO1. Understand the basic unit of all living organisms and to differentiate the structures and functions of various cell organelles present in a eukaryotic cells.

CO2. Have sound knowledge on the concepts of gene, gene interaction, hereditary and variations.

CO3. Articulate sex determination, human karyotyping and genetic disorders

CO4. Appreciate the central dogma of cell and molecular biology and flow of genetic information from DNA to proteins.

CO5. Comprehend the origin of life, process of evolution and the forces operating in evolution of new species and apply the same to develop new and advanced varieties of animals for the benefit of the society.

Unit – V**Origin of life-Evolution****9 hrs**

1.Theories of Evolution :Lamarckism, Darwinism, Germ Plasma theory, Mutation theory

2. Neo-Darwinism: Modern Synthetic theory of Evolution, Hardy-Weinberg Equilibrium

3. Forces of Evolution: Isolating mechanisms, Genetic Drift, Natural Selection, Speciation

Skill Activities:

1. Model/chart preparation of cell and cell organelles
2. Calculation of Mendel traits and human Karyotype
3. Identification of genetic code through photographs
4. Determination of gene pool in a given population

Prescribes books:

Cell Biology - N.Arumugam, Saras Publication

Varma & Agarwal, Cell Biology

Rastogi-A Text Book of Cytology

Reference Text Books:

1. Cell Biology by De Robertis
2. Bruce Alberts, Molecular Biology of the Cell
5. C.B. Pawar, Cell Biology

MARIS STELLA COLLEGE (AUTONOMOUS)-VIJAYAWADA – 8
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SYLLABUS

Subject: Zoology **Semester-III**
Course Title: Cell & Molecular biology, Genetics & Evolution-Practical
Course code: 20ZLP3CG32
No of Hours: 30 **LTP-002** **Credits:2**

Objectives:

- To acquaint students with adequate skills in the usage of laboratory microscopes, slide preparations and identifications.
- To understand basic concepts about inheritance and fossils.

Course outcomes:

- CO1:** Prepare different phases of cell division by experimentation, develop skills on human karyotyping and identification of chromosomal disorders
- CO2:** Apply the basic concept of inheritance for applied research
- CO3:** Identify phylogeny and geological history of origin & evolution of animals

List of Experiments:

I. Cell Biology

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 and problems
2. Study of human Karyotypes-Autosomal (Down's syndrome, Edwards, syndrome, Patau syndrome.
3. Allosomal- Turner's syndrome and Klinefelter's syndrome)

III. Evolution

1. Study of fossil evidences, Study of homology and analogy from suitable specimens and pictures
2. Phylogeny of horse with pictures
3. Study of Genetic Drift by using examples of Darwin's finches (pictures)
4. Visit a Natural History Museum and submit a report.

Reference Books

1. Burns GW. 1972. The Science of Genetics. An Introduction to Heredity. Mac Millan Publ. Co.Inc.
2. Gardner EF. 1975. Principles of Genetics. John Wiley & Sons, Inc. New York.
3. Harth and Jones EW. 1998. Genetics – Principles and Analysis. Jones and BarHett Publ. Boston
4. Levine L. 1969. Biology of the Gene. Toppan.
5. Pedder IJ. 1972. Genetics as a Basic Guide. W. Norton & Company, Inc.
6. Rastogi VB. 1991. A Text Book of Genetics. KedarNath Ram Nath Publications, Meerut, Uttar Pradesh, India.
7. Rastogi VB. 1991. Organic Evolution. KedarNath Ram Nath Publications, Meerut, Uttar Pradesh, India.
8. Stahl FW. 1965. Mechanics of Inheritance. Prentice-Hall.
9. White MJD. 1973. Animal Cytology and Evolution. Cambridge Univ.Press

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA-8
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SYLLABUS

Subject: Zoology

Semester: IV

Course Title: Immunology & Animal Biotechnology

Course code: 20ZLCCIB43

Credits: 3

Total hours: 45

LTP-300

Objectives:

- To guide the student with immunological techniques for the development of a concept.
- To interconnect the theoretical and practical knowledge of immunity with the outer world for the healthier life.
- To demonstrate the basic laboratory skills necessary for Biotechnology research.
- To promote the applications of the lab techniques for taking up research in higher studies

Course outcomes:

CO1: Acquire a complete concept on immunity and immune systems.

CO2: Through practice with lab techniques and procedures

CO3: Know about antigens and antibodies and interactions

CO4: Understand the techniques of Animal Biotechnology

CO5: Knowledge on the PCR and Applications of Animal Biotechnology.

Unit – I

Immunology – I

9hrs

1 Introduction to basic concepts in Immunology

2 Innate and adaptive immunity, Vaccines and Immunization programme

3 Cells of immune System-Lymphoid, Myeloid and Erythroid lineages

4. Lymphoid Organs of immune system –Primary and secondary organs

Unit – II

Immunology – II

9 hrs

1 Antigen: Basic properties of antigens, B and T cell epitopes, haptens and adjuvants; Factors influencing immunogenicity

2 Antibodies: Structure of antibody, Classes and functions of antibodies

3 Structure and functions of major histocompatibility complexes

4 Hypersensitivity – Classification and Types

Unit – III Techniques of Animal Biotechnology**9 hrs**

1. Tissue and Organ culture media: Natural and Synthetic media, Establishment of cell culture (primary culture, secondary culture, Cryopreservation.
2. Established Cell lines (common examples such as MRC, HeLa, CHO, BHK, Vero); types of cell lines)
3. Stem cells: Types of stem cells and applications,
4. Hybridoma Technology- Production & applications of Monoclonal antibodies (mAb).

Unit – IV Applications of Animal Biotechnology**9 hrs**

- 1 Genetic Engineering: Basic concept, Vectors (Plasmid and Bacteriophage) Restriction Endonucleases and Recombinant DNA technology.
2. Gene Delivery- Microinjection. Electroporation, Biolistic method (gene gun), liposome and viral-mediated gene delivery (Retro virus)
3. Transgenic Animals: Strategies of Gene transfer; Transgenic – sheep and applications,
4. Artificial Insemination, In vitro fertilization, super ovulation.

Unit - V**9 hrs.**

1. PCR: Basics of PCR,
2. DNA Sequencing: Sanger's method of DNA sequencing- traditional and automated sequencing
3. Hybridization techniques: Southern, Northern and Western blotting
4. DNA fingerprinting: Procedure and application

Co-curricular activities

1. Organizing awareness on immunization importance
2. Charts on types of cells and organs of immune system
3. Student study projects on– identification of allergies among students (hypersensitivity), blood groups in the class
4. Visit to biotechnological laboratory -University or central institutes and create awareness on PCR, DNA finger printing.

Reference Text books :

1. Biotechnology –I, Cell Biology and Genetics. New Age International Publ. New Delhi, India
2. Immunology by Ivan M. Riott
3. Immunology by Kubey and
4. Sreekrishna V. 2005.

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA- 8
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SYLLABUS

Subject: Zoology

Semester: IV

Course Title: Physiology, Cellular Metabolism & Embryology Credits:3

Course Code: 20ZLCCPE43

No. of Hrs:45

LTP 300

Objectives

- To inculcate in students a thorough understanding of various aspects of physiological systems and the concept of hormonal regulation in animals.
- To provide insightful knowledge on the structure and classification of carbohydrates, proteins, lipids and enzymes
- To demonstrate the function of biomolecules, metabolic pathways and the regulation of biochemical processes
- To help students to have a grip on the development and formation of an embryo.

Course Outcomes:

CO1: Understand the functions of important animal physiological systems, metabolism and the utilization of hormonal control in mammal reproduction

CO2: Describe the structure, classification and chemistry of biomolecules and enzymes responsible for sustenance of life in living organisms.

CO3: Develop a broader understanding on basic metabolic activities pertaining to catabolism and anabolism of various biomolecules.

CO4: Foresee the key events in early embryonic development starting from the formation of gametes up to gastrulation and formation of primary germ layers.

CO5: Gain proficiency in laboratory techniques in biochemistry and orient them to apply the scientific method to the processes of experimentation and hypothesis testing.

UNIT - I

Physiology - I

9 hrs

1. Process of digestion and assimilation in mammals.
2. Respiration - Pulmonary ventilation, transport of oxygen and CO₂
3. Circulation - Structure and functioning of heart, Cardiac cycle
4. Excretion - Structure and functions of kidney, urine formation, counter current Mechanism

UNIT - II

Physiology - II

9 hrs

1. Nerve impulse transmission - Resting membrane potential, origin and propagation of action potentials in myelinated and non-myelinated nerve fibres
2. Muscle contraction - Ultrastructure of muscle, molecular and chemical basis of muscle contraction
3. Endocrine glands - Structure, functions of hormones of pituitary, thyroid, parathyroid, adrenal glands and pancreas
4. Hormonal control of reproduction in a mammal

UNIT - III Cellular Metabolism – I (Biomolecules) 9 hrs

1. Carbohydrates - Classification of carbohydrates. Structure of glucose
2. Proteins - Classification of proteins. General properties of amino acids
3. Lipids - Classification of lipids
4. Enzymes: Classification and Mechanism of Action

UNIT- IV Cellular Metabolism – II 9 hrs

1. Carbohydrate Metabolism - Glycolysis, Krebs cycle, Electron Transport Chain, Glycogen metabolism, Gluconeogenesis
2. Lipid Metabolism – β -oxidation of palmitic acid
3. Protein metabolism - Transamination, Deamination and Urea Cycle

Unit – V Embryology 9 hrs

1. Gametogenesis and Fertilization
2. Types of eggs
3. Types of cleavages
4. Development of Frog up to formation of primary germ layers

Skill activities

1. Models/chart preparation- Album preparation/ Photo Collection of various endocrine glands.
2. Observation and identification of different metabolic Cycles-Glycolysis / krebs cycle/urea cycle etc.

References

1. Goel KA and Satish KV. 1989. A Text Book of Animal Physiology, Rastogi Publications, Meerut, U.P.
- 2.. Hoar WS. General and Comparative Physiology. Prentice Hall of India, New Delhi.
3. Lehninger AL. Nelson and Cox. Principles of Biochemistry. Lange Medical Publications, New Delhi.
4. Developmental Biology - Gerard Karp/ Chordate embryology -Varma and Agarwal
- 5.. Embryology - V.B. Rastogi
6. Reproduction in Mammals. Austen CR and Short RV. 1980. Cambridge University Press.
7. Gilbert SF. 2006. Developmental Biology, 8th Edition. Sinauer Associates Inc., Publishers, Sunderland, USA.

MARIS STELLA COLLEGE (AUTONOMOUS)-VIJAYAWADA – 8
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SYLLABUS

Subject: Zoology **Semester-IV**
Course Title: Physiology, Cellular Metabolism & Embryology-Practical
Course code: 20ZLP4PE42
No of Hours: 30 **LTP-002** **Credits: 2**

Objectives:

- To enable students to identify the histological structure of various organ systems
To Identify different stages of early embryonic development in animals.

Course outcomes

CO1: Recognize and interpret human health based on the composition of blood cells

CO2: Impart skills on handling of instruments to demonstrate various activities of enzyme in vitro

CO3: Explanation of sections- histological slides.

UNIT- I **Animal Physiology**

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

UNIT- 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

UNIT- III **Embryology**

1. Study of T.S. of testis, ovary of a mammal
2. Study of different stages of cleavages (2, 4, 8 Cell)
3. Study of Morula, Blastula and Gastrula .

Reference:

Lab manuals: .. Embryology - V.B. Rastogi

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA-8
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SYLLABUS

Subject: Zoology

Semester: IV

Course Title: Immunology & Animal Biotechnology -Practical

Course code:20ZLP51B42

Total hrs:30

LTP:002

Credits:2

Objectives:

- To acquaint student with immunological techniques taught in the class room
- To demonstrate basic laboratory skills necessary for Biotechnology research.

Course outcomes:

CO1: Differentiate immune organs and Immune techniques.

CO2: Hands on experience –Chromatography, Blotting techniques

CO3: Preparation of culture media

List of experiments:

I. IMMUNOLOGY

1. Demonstration of primary and secondary lymphoid organs (pictures)
2. Histological study of spleen, thymus and lymph nodes (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.

Reference

1. Immunology Lab Biology 477 Lab Manual; Spring 2016 Dr. Julie Jameson
2. Practical Immunology A Laboratory Manual; LAP LAMBERT Academic Publishing
3. Manual of laboratory experiments in cell biology by Edward, G
4. Laboratory Techniques by Plummer

MARIS STELLA COLLEGE (AUTONOMOUS)-VIJAYAWADA-8
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SYLLABUS

Subject: Zoology

Semester: V

Course Title: Sustainable Aquaculture Management-Practical

Course Code: 20ZLP611SA2

No of hours: 45

Credits: 2

LTP: 002

Objectives:

- To inculcate knowledge on farming and disease diagnostic techniques.
- To train the students on modern aquaculture methods.

Course Outcomes:

CO1: Laboratory identification of the characters Indian Major carps.

CO2: Estimate physico chemical characteristics of water used for aquaculture

CO3. Visiting a Hatchery/Farm/ Aqua diagnostic center to examine the diseases of fin and shellfish.

List of Experiments

15 hrs

1. Freshwater Cultivable species of fishes any 4 (Fin & Shell Fish Specimens), Observation of morphological characters by observation and drawings)
2. Hands on training on - determination of water quality in aquaculture (DO, Salinity, pH, Alkalinity) - Standard procedure can be used to estimate various parameters.
3. Viral diseases - any 2 of Fin & Shell Fish (Observation Charts/ pictures of viral pathogens in fin/ shellfish).
4. Bacterial diseases - any 2 of Fin & Shell Fish (Observation of Charts/ pictures of Bacterial pathogens in fin/ shellfish).
5. Fungal diseases any 2 of Fin & ShellFish (Observation through Charts/ pictures)

6. Co-Curricular Activities

15 hrs

1. Observation of aquaculture activities in in the vicinity of the college/village)
2. Assignments/ Group discussion/ Seminar/ Collection of Material, Video preparation etc., Invited lecture and Field notes

References

1. Boyd CE 1982. Water Quality Management for Pond Fish Culture. Elsevier Scientific Publishing Company
2. http://www.fao.org/fishery/docs/CDrom/FAO_Training/FAO_Training/General/x6708e/x6708e06.htm
3. http://aquaticcommons.org/1666/1/Better-Practice3_opt.pdf
4. <https://www.notesonzooology.com/india/fishery/fish-diseases-symptoms-and-control/fishery/871>

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA-8
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SYLLABUS

Subject: Zoology

Semester: V

Course Title: Poultry Farming & Management-Practical

Course Code : 20ZLP621PF2

Credits:2

No of hrs:45

LTP:002

Objectives:

- To collect the additional data on different types of Poultry breeds.
- To evaluate the Economics of Poultry production maximize yield.

Course Outcomes:

CO1: Identify different types of Poultry rearing practices

CO2: Evaluate the efficacy of different types of poultry practices in maximizing yield

CO3: Understand the importance of different hybrid breeds in poultry

List of Experiments

15 hrs

1. Different types of Poultry rearing (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. CARL and Nandanam breeds characters –images/charts

Co-Curricular Activities: 15 hrs

1. Field visit and training: Visit to local poultry farm both Broiler and Layer farm.
- 2..Assignment/PPT/Project work/Video Preparation

References

A Text Book of Animal Husbandry, C. C. Banerjee, Oxford and IBH, Publish Co,
ISBN: 9788120412606

MARIS STELLA COLLEGE (AUTONOMOUS)-VIJAYAWADA-8
(Affiliated to Krishna University, Machilipatnam)
SYLLABUS

Subject: Zoology

Semester:V

Course Title: Livestock Management-I - Practical

Course code:20ZLP631LM2

Credits:2

No .of Hrs: 45

LTP:002

Objectives:

- To compare the merits of cows and Buffaloes through breeding techniques.
- To implement the Procedure & precautions of Artificial Insemination

Course Outcomes:

CO1: Examine the points of dairy cow

CO2: Understand the behavioral changes of cow during the reproductive period

CO3: Differentiate the merits and demerits of cross breeds in cattle

1. Points dairy cow- (Explanation with observation of charts)
2. Identification of different breeds of dairy cattle and buffaloes.(Observation of Pics/Charts of breeds - 3 breeds
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
4. Artificial in semi nation (Flow chart of implements – Procedure & precautions)
5. Pregnancy diagnosis in cattle.
6. Study comparative merits of cows and buffaloes; Zebu and cross bred cows (Examination of merits.

Co-Curricular Activities 15 hrs

1. Collection of various cattle breed images from the web to prepare a album
2. Visit the sites of Veterinary colleges in India and preparation of brief report on the videos and content/ employment details
3. Sketch a model dairy farm with details
4. Invited lecture and presentation on related topics by experts .

Reference Text Books :

1. Principles and practices of Dairy Farm–Jadish Prasad
2. Dairy cow <https://www.icar.org/Guidelines/05-Conformation-Recording.pdf>
3. Pregnancy test protocol:
<https://cgspace.cgiar.org/bitstream/handle/10568/109408/Milk%20testing%20lab%20protocol.pdf?sequence=1&isAllowed=y>

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA-8
(Affiliated to Krishna University, Machilipatnam)
SYLLABUS

Subject: Zoology **Semester: V**
Course Title: Postharvest Technology of Fisheries-Practical
Course code: 20ZLP712PT2
No.of Hrs: 45 **LTP: 002** **Credits: 2**

Objectives:

- To impart standard quality control protocols laid down in the aqua industry.
- To train on Processing, Packing, marketing of processed aqua products

Course outcomes:

- CO1:** Identify the quality of aqua processed products.
CO2: Determine the quality of fishery by products
CO3: Analyze the protocols of aqua processing methods

List of Experiments:

1. Evaluation of fish / fishery products for organoleptic, chemical and microbial quality, Preparation of dried, cured and fermented fish products.
2. Examination of salt, protein, moisture in dried / cured products
3. Examination of spoilage of dried / cured fish products, marinades, pickles, sauce.
4. Preparation of isinglass, collagen and chitosan from shrimp and crab shell.
5. Developing flow charts and exercises in identification of hazards – preparation of hazard analysis worksheet.

6. Co-Curricular Activities—15 hrs

Observation of fish/shrimp processing plants – Field notes.

1. visit web sites of processing companies and record the details of that Unit.
2. Interaction with local fishermen to know the method of preservation and details with the available traditional technology.
3. Collection of web resources on the Quality assurance, quality control measures in Aqua Industries- cross checking the standards during the visit to any processing

References:

1. Dr Sunitha Rai, Fish Processing Technology, 2015, Random Publications
2. https://ecourses.icar.gov.in/e-Learning/download3_new.aspx?Degree Id=03

3. <https://vikaspedia.in/agriculture/fisheries/post-harvest-and-marketing/processing-in-fisheries/fermented-products> ..
4. <https://krishi.icar.gov.in/jspui/bitstream/123456789/20500/1/Fermentation%20technology%20for%20fish.pdf>
5. <http://jebas.org/00200620122014/Abujam%20et%20al%20JEBAS.pdf>

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA-8
(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Zoology

Semester: V

Course Title: Poultry Production & Management- Practical

Course code: 20ZLP722PP2

Credits:2

No of hrs: 45

LTP:002

Objectives:

- To make observations on practices- resources – management and marketing - analysis and submit a handwritten fieldwork
- To acquire knowledge on preparation of Poultry diseases charts

Course Outcomes:

CO1: Identify Poultry diseases by observation

CO2:Analyze Poultry establishment feasibility

CO3:Understand the maintenance of Poultry Records

List of Experiments: 15 hrs

1. Poultry Viral diseases – Observation of histopathological slides /Pictures
2. Poultry Fungal Diseases- Observation of histopathological slides/Pictures
3. Poultry Bacterial Diseases-Observation of histopathological slides/Pictures
4. Preparation of feasibility study report of Poultry establishment.
5. Rearing of Layers and broilers– (Preparation of Flow chart)
6. Hatchery records- Model study/analysis- Report

Co-Curricular Activities

15 hrs

1. Preparation of Poultry diseases charts/Video /slide share
2. Permanent slides/Diagrams

References :

1. HVS Chauhan, S. Roy, Poultry Diseases, Diagnosis and Treatment, New Age International Publishers-2018
2. Flow chart hatchery :
<http://lms.tanuv.ac.in/mod/resource/view.php?id=45106>
3. Feasibility report:
<https://www.manage.gov.in/stry&fcac/content/19.%20Project%20Report%20on%20Layer%20Poultry.pdf>

MARIS STELLA COLLEGE (AUTONOMOUS)-VIJAYAWADA
(Affiliated to Krishna University, Machilipatnam)
SYLLABUS

Subject: Zoology

Semester:V

Course Title: Livestock Management-II -Practical

Course code:20ZLP732LM2

Credits:2

No .of Hrs:45

LTP-002

Objectives:

- To observe dairy techniques common to breeds and management.
 - To gain skill in order to get income in short time.

Course outcomes

CO1: Design a model of dairy farm layout

CO2: Understand procedure of milk pasteurization at milk processing centers

CO3: Identify various important management practices in dairy farming

List of Experiments.

1. Dairy Farm layout (To sketch a dairy farm with all its components)
2. Identification of cows (identify the breeds of cows from the images)
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)

Co-Curricular Activities

1. Sketch model dairy house with details
2. Web resources on Protocols in the management of stages of cattle
3. Properties of varieties of milk from the market observation
4. Assignment, Seminar, Invited lecture, Group discussion. Quiz, Collection of Material, Video preparation etc.

References

1. Handbook of Animal Husbandry –ICAR Edition
2. Dairy farm layout : <https://www.youtube.com/watch?v=dmukHUEUvKc>
3. Dehorning procedure :
<http://www.omafra.gov.on.ca/english/livestock/dairy/facts/09-003.htm>
4. Castration of bulls: <https://vikaspedia.in/agriculture/livestock/general-management-practices-of-livestock/castration-of-ruminants>
5. Deworming: https://kvk.icar.gov.in/API/Content/PPupload/k0347_10.pdf

MARIS STELLA COLLEGE (AUTONOMOUS)-VIJAYAWADA-8

(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Zoology

Semester: V

Course Title: Sustainable Aquaculture Management

Course Code: 20ZLSEC11SA3

No of hours: 45

LTP: 300

Credits: 3

Objectives:

- To raise the qualitative and quantitative aqua produce and good management in Aquaculture.
- To develop skill in breeding techniques to set up ponds in future.

Course Outcomes:

- CO1:** Evaluate the current status of aquaculture at the National level.
- CO2:** Classify the different types of ponds used in aquaculture
- CO3:** Demonstration of induced breeding techniques of Carp fishes.
- CO4:** Acquire critical knowledge on commercial importance of shrimps
- CO5:** Identification of fin and shellfish diseases.

Unit - I

9 hrs

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

Unit - II

9 hrs

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

Unit - III

9 Hrs

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

Unit - IV**9 hrs**

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

Unit - V**9 hrs**

Viral diseases of Fin Fish & shell fish, Fungal diseases of Fin & Shell fish, Bacterial diseases of Finfish & Shellfish , Prophylaxis in aquaculture

Reference Text Books

1. Pillay TVR & M.A.Dill, 1979. Advances in Aquaculture. Fishing News Books Ltd., London
2. Stickney RR 1979. Principles of Warm Water Aquaculture. John Wiley & Sons Inc.1981
3. Boyd CE 1982. Water Quality Management for Pond Fish Culture. Elsevier Scientific Publishing Company.
4. Bose AN et.al. 1991. Costal Aquaculture Engineering. Oxford & IBH Publishing Company Pvt. Ltd.

Web

- Links: 1. http://www.fao.org/fishery/docs/CDrom/FAO_Training/FAO_Training/General/x6708e/x6708e06.htm
2. http://aquaticcommons.org/1666/1/Better-Practice3_opt.pdf
3. <https://www.notesonzoology.com/india/fishery/fish-diseases-symptoms-and-control-fishery/871>

MARIS STELLA COLLEGE (AUTONOMOUS)-VIJAYAWADA-8

(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Zoology

Semester: V

Course Title: Postharvest Technology of Fish & Fisheries

Course Code: 20ZLSEC12PT3

No.of Hrs: 45

LTP: 300

Credits: 3

Objectives:

- To gain knowledge standard quality control protocols laid down in the aqua industry.
- To follow the precautions on how to preserve aquaculture products.

Course outcomes:

CO1: Identify the types of preservation methods employed in aquaculture

CO2 : Choose the suitable Processing methods in aquaculture

CO3 : Maintain the standard quality control protocols laid down in aqua industry

CO4: Identify the best Seafood quality assurance system.

CO5: Understand the Quality Assurance, Management and Certification

Unit - I

9 hrs

Handling and Principles of fish Preservation, Handling of fresh fish, storage and transport of fresh fish, post mortem changes (Rigor mortis and spoilage), spoilage in marine fish and freshwater fish, 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

9 hrs

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

Unit – III

9 hrs

Processing and preservation of fish and fish by-products, 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, Fish by-products – fish glue, Isinglass, chitosan, pearl essence, shark fins, fish Leather and fish maws.

Unit – IV

9 hrs

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

Unit – V

9 hrs

Quality Assurance, Management and Certification, Seafood Quality Assurance and Systems: Standard Operating Procedures (SOPs); Concept of Hazard Analysis and Critical Control Points (HACCP) in seafood safety, National and International standards – ISO 9000: 2000 Series of Quality Assurance System, Codex Alimentarius.

Reference Text Books:

1. Santharam R, N Sukumaran and P Natarajan 1987. A manual of aquaculture, Oxford- IBH, NewDelhi
2. Lakshmi Prasad's, Fish Processing Technology 2012, Arjun Publishing House
3. Dr Sunitha Rai, Fish Processing Technology, 2015, Random Publications

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA--8
(Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Zoology

Course Title: Poultry Farming & Management

Course code : 20ZLSEC21PF3

LTP:300

Semester: V

Credits:3

No of hrs:45

Objectives:

- To understand the comparison of diversified and commercial Poultry practices.
- To maximizing yield how to maintain different types of poultry rearing systems and production.

Course Outcomes:

CO1: Evaluate the status of Indian Poultry Industry

CO2: Explain the Scientific Poultry keeping

CO3: Inspect the different breeds of chicken

CO4: Learning about desi and indigenous breeds

CO5: Knowledge about Central Avian Research Institute

Unit I:

9 hrs

Indian Poultry Industry, Importance of poultry farming and poultry development in India. Present status and future prospectus of poultry Industry, Classification of poultry based on genetics utility

Unit -II

9 hrs

Scientific Poultry Keeping, Modern breeds of Chicken, Present day egg production lines- meat production lines. Types of eggs, transportation and egg storing techniques

Unit-III

9 hrs

Poultry feed, Nutrient requirements for different stages of layers and broilers, Methods of feeding, Poultry Hatchery systems, Methods of mating, selection and care of good hatching eggs,

Unit-IV

9 hrs

Indigenous breeds and economical aspects of desi chicken, Indigenous breeds- Aseel-Chittagong-Kadaknath-Bursa Improved varieties in India – Giriraja-Vanaraja-Girirani-Kalinga brown, Gramapriya, Swarnandhra .

Unit -V

9 hrs

Breeds from Central Avian Research Institute – Izatnagar , CARI Nirbheek - CARI-Shyama-HITCARI (Naked Neck Cross) , CARI- Priya Layer, CARI- Sonali Layer, CARIBRO-VISHAL, CARI-RAINBRO, Nandanam chicken-I, Nandanam Chicken-II, Nandanm-Quail

Reference Text Books:

1. Text Book of Poultry Science, P V Sreenivasaiiah, Write and Print Publications, ISBN No. 9788192970592, 8192970590
2. Poultry Science Practices, Nilothpal Ghosh, CBS Publication & Distributions, 2015
3. Principles of Poultry Science, 1996, CAB Publishers, ISBN 9780851991221
4. A Text Book of Animal Husbandry, C. C. Banerjee, Oxford and IBH, Publish Co, ISBN: 9788120412606

Web sources

1. <https://www.drvet.in/p/e-books.html>
2. <https://byjus.com/biology/animal-husbandry-poultry-farming/>
3. https://www.helpforag.app/2018/02/livestock-production-and-management-lpm_14.html?m=1

MARIS STELLA COLLEGE (AUTONOMOUS), VIJAYAWADA-8
Affiliated to Krishna University, Machilipatnam)

SYLLABUS

Subject: Zoology

Semester: V

Course Title: Poultry Production & Management

Course code: 20ZLSEC22PP3

No of hrs: 45

Credits:3

LTP: 300

Objectives:

- To differentiate the poultry hatchery practices to produce high yielding breeds.
- To develop field skills training and principles.

Course outcomes:

CO1: Suggest measure for Health care in Poultry

CO2: Evaluate the economics of poultry production

CO3: Elaborate the poultry Breeder flock management

CO4: Hatchery Practices- Management principles of incubation

CO5: Fertility disorder- etiology, diagnosis and corrective measures

Unit-I

9 hrs

Health Care - Common poultry diseases: bacterial, viral, fungal, parasitic and nutritional deficiencies, Vaccination schedule for commercial layers and broilers: factors that govern vaccination schedule; pre and post vaccination care, Types of disinfectants; mode of action, precaution and handling.

Unit-II

9 hrs

Economics of layer and broiler production, Projects reports in different systems of rearing for layer & broilers, Feasibility studies on poultry rearing- in context of small units and their profitability, Export/import of poultry and poultry products.

Unit -III

9 hrs

Breeder Flock Management: Layer and broiler breeder flock management housing & space requirements, Different stage of management during life cycle; Light management during growing and laying period, Artificial insemination. Feed restriction, requirement of layer and broiler breeders of different age groups.

Unit-IV

9 hrs

Breeder Healthcare - Vaccination of breeder flock; difference between vaccination schedule of broilers and commercial birds, Common diseases of breeders (Infectious and metabolic disorders)-prevention, Fertility disorder- etiology, diagnosis and corrective measures. Selection and culling of breeder flocks

Unit-V**9 hrs**

Hatchery Practices- Management principles of incubation, Factors affecting fertility and hatchability. Selection, care and incubation of hatching eggs. Fumigation; sanitation and hatchery hygiene, Importance of hatchery records, break even analysis of unhatched eggs. Computer applications for hatchery management

Reference Text Books:

HVS Chauhan, S. Roy, Poultry Diseases, Diagnosis and Treatment, New Age International Publishers-2018 .

<https://www.drvet.in/p/e-books.html>

<https://byjus.com/biology/animal-husbandry-poultry-farming/>

https://www.helpforag.app/2018/02/livestock-production-and-management/lpm_14.html?m=1

MARIS STELLA COLLEGE (AUTONOMOUS)-VIJAYAWADA-8
(Affiliated to Krishna University, Machilipatnam)
SYLLABUS

Subject: Zoology

Semester V

Course Title: Livestock Management-I

Credits:3

Course code: 20ZLSEC31LM3

No.of Hrs: 45

LTP-300

Objectives

- To apprise the various breeding techniques employed in livestock.
- To apply biotechnological applications to improve quality of milk.

Course Outcomes:

CO1: Relate the anatomy of udder with letdown of milk

CO2: Identify and manipulate the reproductive behavior of cattle

CO3: Inspect the economics of dairy farming

CO4: r-DNA technology-Cloning

CO5: Awareness on cross breeding of cattle and grading up of buffaloes.

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 Galactopoises; 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.

Unit 5:

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

Reference Text Books;

1. Textbook of Animal Husbandry-GC Benarjee
2. Handbook of Animal Husbandry –ICAR Edition
3. Principles and practices of Dairy Farm–Jagdish Prasad

Web resources:

1. <http://ecoursesonline.iasri.res.in/course/index.php?categoryid=42>
2. <https://vetsebooks.blogspot.com/p/e-books.html>
3. <https://www.basu.org.in/study-materials/veterinary-science/>
4. <https://vikaspedia.in/agriculture/livestock/cattle-buffalo/breeds-of-cattle-buffalo>

MARIS STELLA COLLEGE (AUTONOMOUS)-VIJAYAWADA
(Affiliated to Krishna University, Machilipatnam)
SYLLABUS

Subject: Zoology

Semester: V

Course Title: Livestock Management-II

Course code:20ZLSEC32LM3

No .of Hrs:45

Credits:3

LTP-300

Objectives:

- To train students on the procedure of milk pasteurization at milk processing centers
preparation of cream from Milk
- To design a model dairy farm layout

Course Outcomes:

CO1; Identify and suggest the suitable housing system for the dairy farming

CO2; Understand management practices for the dairy farming

CO3: Learn the process of milk pasteurization

Unit 1:

9 hrs

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.

Unit 2:

9 hrs

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:

9 hrs

(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:

9

hrs

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

Unit 5:

9 hrs

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.

ReferencesText Books

1. Textbook of Animal Husbandry-G C Benarjee
2. Handbook of Animal Husbandry –ICAR Edition
3. Principles and practices of Dairy Farm–Jagdish Prasad
4. <http://ecoursesonline.iasri.res.in/course/index.php?categoryid=42>
5. <https://vetsebooks.blogspot.com/p/e-books.html>
6. <https://www.basu.org.in/study-materials/veterinary-science/>
7. <https://vikaspedia.in/agriculture/livestock/cattle-buffalo/breeds-of-cattle-buffalo>