

ADUSUMILLI GOPALAKRISHNAIAH & SUGAR CANE GROWERS SIDDHARTHA DEGREE COLLEGE OF
ARTS & SCIENCE, VUYURU-521165, KRISHNA Dt., A.P. (AUTONOMOUS).

NACC reaccredited at 'A' level

Autonomous –ISO 9001-2015 Certified

Title of the Paper: **Introduction to Classical Biology**

Semester: - I

Course Code	23CBLT01	Course Delivery Method	Class Room/Blended Mode - Both
Credits	4	CIA Marks	30
No. of Lecture Hours/ Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2023-2024	Year of Offering 2023-2024	Year of Revision –	Percentage of Revision: 0%

Learning objectives

The student will be able to learn the diversity and classification of living organisms and understand their chemical, cytological, evolutionary and genetic principles.

Learning Out comes:

CO 1	Learn the principles of classification and preservation of biodiversity
CO 2	Understand the plant anatomical, physiological and reproductive processes
CO 3	Knowledge on animal classification, physiology, embryonic development and their economic importance
CO 4	Outline the cell components, cell processes like cell division, heredity and molecular processes.
CO 5	Comprehend the chemical principles in shaping and driving the macromolecules and life processes.

Unit	Learning Units	Lecture Hours
I	<p>Unit1: Introduction to systematic, taxonomy and ecology. Systematic –Definition and concept, Taxonomy– Definition and hierarchy. Nomenclature–ICBN and ICZN, Binomial and trinomial nomenclature. Ecology – Concept of ecosystem,(Structure and function-outlines) Biodiversity and conservation.(Value of Biodiversity and types of conservation) Pollution and climate change. (Causes, effects of air, water and soil pollution, ozone ion, acid rain, greenhouse gases, global warming.</p>	12
II	<p>Unit2: Essentials of Botany. The classification of plant kingdom. (2Whittaker Classification of Plantae) Plant physiological processes (Photosynthesis- light &dark reactions, Respiration (- glycolysis ,link reaction, Krebs cycle& oxidative phosphorylation, Transpiration- types ,stomatal complex, mechanism of stomatal movement based on K⁺ ion movement), phytohormones - Role of Auxins, Gibberellins, Cytokinins, Abscisic acid ,Ethylene). Structure of flower–Micro and macro sporogenesis, pollination-(types& agents), fertilization and structure of mono and dicot embryos. Mushroom cultivation, oyster floriculture (of local flowers) and landscaping. (Principles)</p>	15
III	<p>Essentials of zoology Broad classification of Kingdom Animalia up to phyla. Animal Physiology – Basics of Organ Systems and their functions, Hormones and Disorders. Developmental Biology – Gametogenesis, Fertilization, Cleavage and Organogenesis (Basic concepts) Economic Zoology – Sericulture, Apiculture, Aquaculture (Concepts and Economic Importance.)</p>	12
IV	<p>Evolution, Cell Biology and Genetics Origin of life Cell theory , Ultra structure of prokaryotic and eukaryotic cell, cell cycle(Outlines only) Chromosomes and heredity – Structure of chromosomes, concept of gene. Central Dogma of Molecular Biology (Outlines of transcription and translation, Role of genetic code)</p>	09
V	<p>Essentials of chemistry Definition and scope of chemistry, applications of chemistry in daily life (Chemistry in food, Agriculture, Hygiene , Cosmetics, and Textiles & Building construction). Branches of chemistry (Inorganic, Organic ,Physical , Analytical and Industrial chemistry) Chemical bonds- ionic , covalent, non – covalent – vanderwaals , hydrophobic , hydrogen bonds. Green chemistry</p>	12

References

1. Sharma O.P., 1993. Plant taxonomy. 2nd Edition. McGraw Hill publishers.
2. Pandey B.P. 2001. The text book of botany Angiosperms. 4th edition. S.Chand publishers, New Delhi, India.
3. Jordan E.L., Verma P.S., 2018. Chordate Zoology. Scand publishers, New Delhi, India.
4. Restage, S.C., 2019. Essentials of animal physiology. 4th Edition. New Age International Publishers.
5. Verma P.S., Agarwal V.K., 2006. Cell biology, genetics, Molecular Biology, Evolution and Ecology. S. Chan publishers, New Delhi, India.
6. Satyanarayana U., Chakrapani, U., 2013. Biochemistry. 4th Edition. Elsevier publishers.
7. Jain J.L., Sunjay Jain, Nitin Jain, 2000. Fundamental soft Biochemistry .S.Chand publishers, New Delhi, India.
8. Karen Timber lake, William Timber lake, 2019. Basic chemistry. 5th Edition. Pearson publishers.
9. Subrata Sen Gupta, 2014. Organic chemistry. 1st Edition. Oxford publishers.

ACTIVITIES- I (At the end of I Semester)

Title of the paper: Introduction to Classical Biology

No of Hours: 30
WEF: 2023-2024

Credits: 01
Course Code: 23CBLT01

ACTIVITIES:

1. Make a display chart of life cycle of non flowering plants.
2. Make a display chart of life cycle of flowering plants.
3. Study of stomata
4. Activity to prove that chlorophyll is essential for photo synthesis
5. Study of pollen grains.
6. Observation of pollen germination.
7. Ikebana.
8. Differentiate between edible and poisonous mushrooms.
9. Visit a near by mushroom cultivation unit and know the economic soft mushroom cultivation.
10. Draw the Ultra structure of Prokaryotic and Eukaryotic Cell
11. Visit to Zoology Lab and observe different types of preservation of specimens
12. Hands-on experience of various equipment – Microscopes, Centrifuge, pH Meter, Electronic Weighing Balance, Laminar Air Flow
13. Visit to Zoo/Sericulture / Apiculture/ Aquaculture unit
14. List out different hormonal, genetic and physiological disorders from the society

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Autonomous –ISO 9001-2015 Certified

Title of the Paper: **Introduction to Applied Biology**

Semester: - I

Course Code	23ABLT01	Course Delivery Method	Class Room/Blended Mode - Both
Credits	4	CIA Marks	30
No. of Lecture Hours/ Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2023-2024	Year of Offering 2023-2024	Year of Revision –	Percentage of Revision: 0%

Learning objectives

The student will be able to learn the foundations and principles of microbiology, immunology, biochemistry, biotechnology, analytical tools, quantitative methods, and bioinformatics.

Learning Outcomes:

CO 1	Learn the history, ultra structure, diversity and importance of microorganisms.
CO 2	Understand the structure and functions of macromolecules
CO 3	Knowledge on biotechnology principles and its applications in food and medicine
CO 4	Outline the techniques, tools and their uses in diagnosis and therapy
CO 5	Demonstrate the bioinformatics and statistical tools in comprehending the complex biological data.

Syllabus

Unit	Learning Units	Lecture Hours
I	<p>Essentials of Microbiology and Immunology History and Major Milestones of Microbiology, Contributions of Louis Pasteur, Robert Koch, Edward Jenner and Joseph Lister. Structure and characteristics of Bacteria, Fungi, Archaea and Viruses. Applications of microorganisms in Food, Agriculture, Environment and Industry. Immune system – Types of immunity (Innate and Acquired), Cells and organs of immune system.</p>	12
II	<p>Essentials of Biochemistry Bio molecules I – Carbohydrates, Lipids (General Structure, classification and Biological importance). Bio molecules II – Amino acids (General Structure, classification- Essential and Non- Essential and Biological importance), Proteins(General Structure, classification and Biological importance) Bio molecules III – Nucleic acids - DNA and RNA (Structure, Types and Biological importance) Basics of Metabolism – Anabolism and catabolism (Definition and examples)</p>	12
III	<p>Essentials of Biotechnology History, scope and significance of Bio technology- Applications of Biotechnology in Plant, Animal, Industrial and Pharmaceutical sciences. Environmental Biotechnology – Bio remediation and Bio fuels, Bio fertilizers and Bio pesticides. (Definitions and common examples) Genetic engineering – Gene manipulation using restriction enzymes and cloning vectors- P^{BR322}, λ phage. Methods of Gene transfer- Physical- Electroporation, chemical- PEG, and Biological- Transduction. Transgenic plants – Stress tolerant plants (biotic stress – BT cotton, abiotic stress – salt tolerance). Transgenic animals – Animal (Fish) and disease models.(Mouse)</p>	15
IV	<p>Analytical Tools and techniques in biology – Applications Applications in forensics – PCR and DNA fingerprinting (Concept and application) Immunological techniques – Immunoblotting and ELISA. (Concept and application) Monoclonal antibodies – Applications in diagnosis and therapy. Eugenics and Gene therapy (Definition and examples)</p>	09
V	<p>Biostatistics and Bioinformatics Data collection and sampling. Measures of central tendency – Mean, Median, Mode. Measures of dispersion – range, standard deviation and variance. Probability and tests of significance- t- test Introduction , Genomics, Proteomics, types of Biological data, Biological databases- NCBI,EBI, Gen Bank; Protein 3D structures, Sequence alignment. Accessing Nucleic Acid and Protein databases, NCBI Genome Workbench</p>	12

REFERENCES

1. Gerard J., Tortora, Berdell R. Funke, Christine L. Case., 2016. Microbiology: An Introduction. 11th Edition. Pearson publications, London, England.
2. Micale, J. Pelczar Jr., E.C.S. Chan., Noel R. Kraig., 2002. Pelczar Microbiology. 5th Edition. McGraw Education, New York, USA.
3. Sathyanarayana U., Chakrapani, U., 2013. Biochemistry. 4th Edition. Elsevier publishers.
4. Jain J.L., Sunjay Jain, Nitin Jain, 2000. Fundamentals of Biochemistry. S. Chand publishers, New Delhi, India.
5. R.C. Dubey, 2014. Advanced Biotechnology. S. Chand Publishers, New Delhi, India.
6. Colin Ratledge, Bjorn, Kristiansen, 2008. Basic Biotechnology. 3rd Edition. Cambridge Publishers.
7. U. Sathyanarayana, 2005. Biotechnology. 1st Edition. Books and Allied Publishers pvt. Ltd., Kolkata.
8. Upadhyay, Upadhyay and Nath. 2016. Biophysical Chemistry, Principles and Techniques. Himalaya Publishing House.
9. Arthur M. Lesk. Introduction to Bioinformatics. 5th Edition. Oxford publishers.
10. AP Kulkarni, 2020. Basics of Biostatistics. 2nd Edition. CBS publishers.

ACTIVITIES- I (At the end of I Semester)

Title of the paper: Introduction to Applied Biology

No of Hours: 30
WEF: 2023-2024

Credits: 01
Course Code: 23ABLP01

ACTIVITIES

1. Identification of given organism as harmful or beneficial.
2. Observation of microorganisms from house dust under microscope.
3. Finding microorganism from pond water.
4. Visit to a microbiology industry or biotech company.
5. Visit to a waste water treatment plant.
6. Retrieving a DNA or protein sequence of a gene'
7. Performing a BLAST analysis for DNA and protein.
8. Problems on biostatistics.
9. Field trip and awareness programs on environmental pollution by different types of wastes and hazardous materials.
10. Demonstration on basic biotechnology lab equipment.
11. Preparation of 3D models of genetic engineering techniques.
12. Preparation of 3D models of transgenic plants and animals.

[NOTE: In the colleges where there is availability of faculty for microbiology and biotechnology, those chapters need to be handled by microbiology and biotechnology faculty. In other colleges, the above topics shall be dealt by Botany and Zoology faculty]

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Title of the Paper: Cell Biology, Cellular Metabolism, Genetics, Organic Evolution and Animal Behaviour
Semester: - III

Course Code	ZOOT31A	Course Delivery Method	Class Room/Blended Mode - Both
Credits	4	CIA Marks	30
No. of Lecture Hours/ Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2020-21	Year of Offering:2023-24	Year of Revision :2022-23	Percentage of Revision: 30%

Learning Outcomes:

CO 1	To understand the basic unit of the living organisms and to differentiate the organisms by their cell structure. Describe fine structure and function of plasma membrane and different cell organelles of eukaryotic cell.
CO 2	To understand the history of origin of branch of genetics, gain knowledge on heredity, interaction of genes, various types of inheritance patterns existing in animals
CO 3	Acquiring in-depth knowledge on various of aspects of genetics involved in sex determination, human karyotyping and mutations of chromosomes resulting in various disorders
CO 4	Understand the central dogma of molecular biology and flow of genetic information from DNA to proteins.
CO 5	Understand the principles and forces of evolution of life on earth, the process of evolution of new species and apply the same to develop new and advanced varieties of animals for the benefit of the society

Syllabus
Course Details

Unit	Learning Units	Lecture Hours
I	Cell Biology Electron microscopic structure of animal cell. Structure and functions of Golgi complex, Endoplasmic Reticulum And Liposome's Structure and functions of Ribosome's and Mitochondria Structure and functions of Chromosomes (Polytene and Lamp brush chromosomes) Structure and functions of Nucleus and its components	14
II	Cellular Metabolism Bio molecules Carbohydrates - Classification of carbohydrates; Structure of glucose .Proteins - Classification of proteins; General properties of amino acids Lipids - Classification of lipids Carbohydrate metabolism – Glycogen metabolism, Gluconeogenesis Protein metabolism-Transamination, Deamination and Urea Cycle	11
III	Genetics Gene interactions (lethal genes, Epistasis &Pleiotropy) DNA damage and repair Human karyotyping and amniocentesis Autosomal and allosomal disorders (Klinefelter syndrome, Turner Syndrome, Down syndrome, Phenylketonuria, Alkaptonuria& Sickle cell anaemia)	11
IV	Organic evolution Modern synthetic theory of evolution2 Hours Variations Isolating mechanisms Types of natural selection (directional, stabilizing & disruptive) Artificial selection Speciation – allopatry and sympatry. Microevolution vs. Macroevolution (Example: Darwin finches)	10
V	Animal Behaviour Ethology and its branches. Concepts of Ethology (motivation, fixed action patterns, releasers, learning) Biological clocks1 Hour Biological rhythms (Circadian, Circalunar and Circannual) Sexual behaviour in animals (Intra sexual selection & Inter sexual selection) Colouration& Mimicry	14

w.e.f. 2022-2023.

Paper Title Cell Biology, Cellular Metabolism, Genetics, Organic Evolution and Animal Behaviour.

Code: ZOOP31A

MAX.MARKS: 40.

(3hrs/week)

Credits: 02

(30 hrs)

PRACTICAL SYLLABUS

Learning Objectives:

Acquainting and skill enhancement in the usage of laboratory microscope

Hands-on experience of different phases of cell division by experimentation

Develop skills on human karyotyping and identification of chromosomal disorders

To apply the basic concept of inheritance for applied research

To get familiar with phylogeny and geological history of origin & evolution of animals.

I CellBiology

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

II. Cellular Metabolism

1. Estimation of total proteins in given solutions by Biurette method.
2. Estimation of total carbohydrate by Trinder's method.

III. Genetics

A, B, O blood typing. Problems based on Blood grouping.

Karyotyping of human chromosomes [Human karyotype figure on paper should be cut in to different sets of chromosomes and students are asked to arrange them in an order and comment on the ideogram]

Identification of genetic syndromes given on charts.

Pedigree Analysis

IV. 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 finches (pictures)

V. Animal Behaviour

1. Protective behaviour

Protective colouration in *Octopus*

Protective behaviour in *Sepia*

Protective behaviour in *Chamaeleon*

2. Social behaviour

Social insects- honey bees and white ants

Parental care in fishes (Hippocampus)

Parental care in amphibians (*Ichthyophis*)

Migration in fishes (*Anguilla & Hilsa*)

3. Nesting behaviour

Spider web

Bee hive

Bird nests

4. Submission of a mini project on Animal Behaviour

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Title of the Paper: **Sustainable Aquaculture management**
Semester: - V

Course Code	ZOOS01	Course Delivery Method	Class Room/Blended Mode - Both
Credits	3	CIA Marks	25
No. of Lecture Hours/ Week	3	Semester End Exam Marks	75
Total Number of Lecture Hours	45	Total Marks	100
Year of Introduction : 2020-21	Year of Offering:2023- 24	Year of Revision :2023- 24	Percentage of Revision: 30 %

Learning Outcomes: -Students at the successful completion of this course will be able to

Learning Outcomes:

CO 1	Aquaculture is a rapidly growing fisheries sector in India with an annual growth rate of over 7%
CO 2	A fertilizer for fishponds comes in tablets and will provide a slow release of nutrients that is gentle and easy on your pond's citizens.
CO 3	Pre-stocking management aims at proper preparation of ponds to remove the causes of poor survival, unsatisfactory growth, etc
CO 4	Sustainable, productive fisheries and aquaculture improve food and nutrition security, increase income and improve livelihoods, promote economic growth and protect our environment and natural resources.
CO 5	Many of the disorders and diseases that are known to occur in fish are the result of stress, poor water quality, overcrowding, and failure

Syllabus
Course Details

Unit	Learning Units	Lecture Hours
I	Present status of Aquaculture–Global and National scenario. Majorcultivable speciesforaquaculture: freshwater, brackish water and marine, criteria for selection of species for culture. Culture practices and culture systems Traditional, extensive, modified extensive, semi-intensive and intensive, ponds, race ways, cages and pens	15
II	Functional classification of ponds – nursery, rearing, stocking and quarantine ponds. Pond preparation, fertilizer and manure application in culture ponds. Physio- chemical conditions of soil and water optimal for culture (Temperature, depth, turbidity, PH, BOD, CO ₂ , N, P, K and C:N ratio)	12
III	Induced breeding in carps (Catla -Labeo) and shrimp (peneaus and vannamei – P.monodon). Culture of Indian major carps–Pre Stocking management. Culture of Indian major carps – Stocking management. Culture of Indian major carps-post-stocking management	12
IV	Commercial importance of shrimp & prawn <i>Macro brachium rosenbergii</i> - biology, seed production. Culture of <i>L. vannamei</i> – hatchery technology and culture practices Mixed culture of fish and prawns.	9
V	Viral diseases of Fin Fish & shell fish Fungal diseases of Fin & Shell fish Bacterial diseases of Finfish & Shell fish Protozoan and metazoan diseases of fin fish and shell fish	12

III Text Book

1. S. Armugam, A text book of Aquaculture: ISBN: 978-93-82459-99-6.
2. Kondaiah .A and Vijayalaxmi, A text book of Aquaculture.

Web links:

<https://www.youtube.com/watch?v=rv8fzewn2gu>

<https://www.youtube.com/watch?v=w9oy1loucvw>

IV Co- Curricular Activities:

1. Preparation of Model/ Charts of Cultivable species of fin fish shellfish
2. Preparation of Model/Chart of Ideal fish Pond-with the standards prescribed.
3. Observation of aquaculture activities in their area (Observation of any activity related to aquaculture in the vicinity of the college/village)
4. Preparation of Model –charts of Fin/Shellfish Diseases with eco-friendly material.
5. Assignments, Group discussion, Seminar, Quiz, Collection of Material, Video preparation etc., Invited lecture

Mandatory :(Training of students by teacher in field related skills:(lab:10 + field: 05)

For Teacher: Training of students by the teacher (if necessary, by a local expert) in laboratory/field for a total of not less than 15 hours on the field techniques/skills on the familiarization of various optical instruments available in the laboratory; construction of different types of telescopes and their comparison in construction, operation and their utility and limitations; the details of construction of eye and various defects in the eye sight, emerging techniques in the design of eye lenses including contact lenses and making the student to understand on the testing of a biological sample using a clinical microscope

For Student: Students shall (individually) visit and observe the functioning of optical instrument at any one of the following places /centre like

Pathological laboratory or

A local ophthalmologist or

A local optician to understand the various types of eye lenses or

A local computer based eye testing center or

An optician, who fixes contact lenses or

A local cinema theatre or

A planetarium.

Student shall write the observations and submit a hand-written Fieldwork/ Project work not exceeding 10 pages in the given format to the teacher.

1. Max marks for Fieldwork/Project work: 10.
2. Suggested Format for Fieldwork/Project work: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.
3. Comprehensive Continuous Assessment Test (CCIA): (2 tests will be conducted, each carries 30 Marks, consider Average Mark: 15)

w.e.f. 2022-2023.

Code: ZOOSEP01 Sustainable Aquaculture management

MAX.MARKS: 40.

(3hrs/week)

Credits: 02

(30 hrs)

PRACTICAL SYLLABUS

Practical syllabus: (30 Periods): At least 8 Practical

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 & Shellfish-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 as 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 o same in the laboratory)

III .Lab References:

1. Chakraborty C & Sadhu AK. 2000. Biology Hatchery and Culture Technology of Tiger Prawn and Giant Freshwater Prawn. Daya Publ. House.

ICAR. 2006. Handbook of Fisheries and Aquaculture. ICAR.

Jhingran VG & Pullin RSV. 1985. Hatchery Manual for the Common, Chinese and Indian Major Carps. ICLARM, Philippines.

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Title of the Paper: **Post harvest Technology of Fish and Fisheries**

Semester: - V

Course Code	ZOOS02	Course Delivery Method	Class Room/Blended Mode - Both
Credits	4	CIA Marks	25
No. of Lecture Hours/ Week	3	Semester End Exam Marks	75
Total Number of Lecture Hours	45	Total Marks	100
Year of Introduction : 2021-22	Year of Offering:2023-24	Year of Revision –	Percentage of Revision: 0%

I. Course Outcomes: Students at the successful completion of the course will be able to:

Learning Outcomes:

CO 1	Before refrigerating a fish, wash it in cold water and dry it with a clean cloth or paper towels.
CO 2	Fish are preserved through such traditional methods as drying, smoking and salting. The oldest traditional way of preserving fish was to let the wind and sundry it.
CO 3	The traditional fishery byproducts are fishmeal, fish body and liver oils, fish maw, isinglass etc.
CO 4	Proper personal hygiene, including frequent hand and arm washing and covering cuts; Proper cleaning and sanitizing of all food contact surfaces.
CO 5	HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards.

Unit	Learning Units	Lecture Hours
I	<p>Handling and Principles of fish Preservation Handling of fresh fish, storage and transport of fresh fish, postmortem changes (rigor mortis and spoilage), microbial ,spoilage in fish and their prevention , process value calculation. 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.</p>	13
II	<p>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).</p>	10
III	<p>Processing and preservation of fish and their by-products Fish products–fish mincedmeat,fishmeal,fishoil,fishliquid(ensilage),fish protein concentrate, 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,fishLeather and fish maws.</p>	17
IV	<p>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.</p>	14
V	<p>Quality Assurance, Management and Certification 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 trace ability. National and International standards– ISO9000:2000 Series of Quality Assurance System, Codex Alimentarius, detection of antibiotics and heavy metals in fishery</p>	6

References:

SantharamR,NSukumaranandPNatarajan1987.Amanualofaquaculture,Oxford-IBH,NewDelhi.
 LakshmiPrasad’s,FishProcessingTechnology2012,ArjunPublishingHouse
 DrSunithaRai,Fish ProcessingTechnology,2015, RandomPublications

WebResources:

<http://ecoursesonline.iasri.res.in/mod/page/view.php?id=145743>
https://ecourses.icar.gov.in/e-Learningdownload3_new.aspx?Degree_Id=03

Co –curricular activities:

Observation of fish/shrimp processing plants–visit web sites of processing companies and records the details of that Unit.

Interactionwithlocalfishermentoknowthethodofpreservationanddetailswiththeavailabletraditional technology

Collection of web resources on the Quality assurance, quality contro measures in Aqua Industries-cross checking he standards during the visit to any processing units.

Assignments, Seminar Group discussion. Quiz, Collection of Material, Invited lecture, Video preparation etc.,

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PRACTICAL - V

w.e.f. 2021-2022.
Code: ZOOSEP02
MAX.MARKS: 40.
Credits: 02

Paper Title: Post harvest Technology of Fish and Fisheries
(3hrs/week)
(30 hrs)

PRACTICAL SYLLABUS

Learning Outcomes:

- CO1: Before refrigerating a fish, wash it in cold water and dry it with a clean cloth or paper towels.
- .CO2: Fish are preserved through such traditional methods as drying, smoking and salting. The Oldest traditional way of preserving fish was to let the wind and sundry it.
- CO3: The traditional fishery by products is fishmeal, fish body and liver oils, fish maw, Isinglass etc.
- CO4: Proper personal hygiene, including frequent hand and arm washing and covering cuts; Proper cleaning and sanitizing.
- CO5: HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material.

Practical Syllabus:

1. Evaluation of fish/fishery products for organoleptic, chemical and microbial quality.
2. Preparation of dried, cured and fermented fish
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 work sheet
7. Corrective action procedures in processing of fish-flowchart-work sheet preparation.

References:

1. Balachandran KK. 2001. Post-harvest Technology of Fish and Fish Products. Daya Publ.
2. Bond, et al. 1971. Fish Inspection and Quality Control.Fishing News Books, England.

Websites of Interest:

https://www.youtube.com/watch?v=xyf_g7fku-4
https://www.youtube.com/watch?v=bvtqb_ccmy4

**LIFE SKILL COURSE
OFFERED BY**

THE DEPARTMENT OF ZOOLOGY

DURING -2023-2024

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Title of the Paper: **Poultry Farming**
Semester: - III

Course Code	LSCZOOT01	Course Delivery Method	Class Room/Blended Mode - Both
Credits	2	CIA Marks	15
No. of Lecture Hours/ Week	2	Semester End Exam Marks	35
Total Number of Lecture Hours	06	Total Marks	50
Year of Introduction : 2023-24	Year of Offering 2023-2024	Year of Revision –	Percentage of Revision: 0%

SKILL DEVELOPMENT COURSE	Course code: LSCZOOT01	2023-2024	B. Com (G), B.Com e-commerce, B.Com-Computers,
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Learning Outcomes:

By successful completion of the course, students will be able to;

1. Understand the field level structure and functioning of insurance sector and its role in protecting the risks
2. Comprehend pertaining skills and their application for promoting insurance coverage
3. Prepare better for the Insurance Agent examination conducted by IRDA
4. Plan 'promoting insurance coverage practice' as one of the career options.

COURSE OUTCOMES

CO 1	Understand the basic concepts of poultry farming and apply the same in the management practices of poultry farming.
CO 2	Acquire knowledge in the preparation of project report for banking and insurance.
CO 3	Acquaint with the poultry feed management practices
CO 4	Understand the nutrient requirements for different stages of layers and broilers
CO 5	Gain knowledge in harvesting of eggs and recycling of poultry waste.

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	Section I (Introduction to Poultry Farming): General introduction to poultry farming -Definition of Poultry; past and present scenario of poultry industry in India. Principles of poultry housing. Poultry houses, Systems of poultry farming. Management of chicks, growers and layers. Management of Broilers. Preparation of project report for banking and insurance	10
II	Section II (Feed and Livestock Health Management): Poultry feed management – Principles of feeding, Nutrient requirements for different stages of layers and broilers. Feed formulation and Methods of feeding. Poultry diseases – viral, bacterial, fungal and parasitic (two each); symptoms, control and management; Vaccination programme.	10
III	Section III (Harvesting of Eggs and Sanitation): Selection, care and handling of hatching eggs. Egg testing Methods of hatching. Brooding and rearing. Sexing of chicks. Farm and Water Hygiene, Recycling of poultry waste.	10

Co- Curricular Activities suggested:

(4 Hrs)

1. Group discussion & SWOT analysis
2. Visit to a poultry farm
3. Invited Lectures by Concerned officers of government or private farms
4. Cheap and Healthy Feed preparation by students based on government standards
5. Market study and Survey (Monitoring of daily price hike in poultry market and analysis)
6. Online Swayam Moocs course on poultry farming (see reference 9 below)

Reference books:

1. Sreenivasaiah., P. V., 2015. Textbook of Poultry Science. 1st Edition. Write & Print Publications, New Delhi
2. Jull A. Morley, 2007. Successful Poultry Management. 2nd Edition. Biotech Books, New Delhi"