KHEJURI COLLEGE
Baratala :: Purba Medinipur

DEPARTMENT OF AQUACULTURE MANAGEMENT

COURSE OUTCOMES FOR B.Sc. in AQUACULTURE MANAGEMENT

NAME OF THE PROGRAMME: B.Sc. in Aquaculture Management
LIST OF COURSE OUTCOMES:
CC-1 : Taxonomy, Anatomy & Biology of Fin fishes and Shell fishes
Course outcome:
- Students understand the key characteristics of shrimps and prawns for identification.
- Assess the systematic position and general morphology of shrimp and prawns.
- Differentiate Penaeid and Non-penaeid prawns.
- Understand the internal and external anatomy of a shellfish in details.
- Identify the different parts of a shellfish and describe the function of each part.
- Understand the internal organs and their functions.
- Study the life forms of shellfish with regard to their food and feeding habits, age and growth followed by reproduction.

CC-2 : Capture Fisheries
Course outcome:
- By This topics Student know about overview of commercial fishing & Sport fishing & also recent fish catch statistics.
- Deals with different species of fish require different habits & food sources for survival Capture Fisheries.
- Useful to know the characters of streams, riverine systems in India & their fishery.
- Useful to know the east coast river systems & West Coast river systems.
- Subject includes different reservoirs of river systems in India. & Andhra Pradesh.

CC-3 : Aquaculture Practices
Course outcome:
- Students can appreciate the importance of freshwater as a resource
- Differentiate different form of freshwaters and know the type of freshwaters where fish culture can be practiced.
- List the freshwater fish species being cultured, and potential species of India
- Comprehend the status of freshwater aquaculture in India.
- Species are being grown around the world, what is their production, which countries are producing which species of fish?
- The resources available in India to develop coastal aquaculture and mariculture, the areas available for culture of brackish water finfish, shellfish and seaweeds
- The resources of seed of cultivable fish and the gears used to catch them.

CC-4 : Genetics & Reproduction in fish.

Course outcome:

At the end of this course, each student will be able to:

- Master the knowledge behind the genetic modifications and improvements of fish.
- Understand the genetic and genomic approaches to fisheries management.
- Understand the genetic approaches and technologies currently applied in aquaculture.
- Perceive the most updated genetic applications for aquaculture.
- Apply the knowledge from this course for their own research and extension projects.
- Develop critical thinking for the fast-developing genetic modifications in aquaculture.
- Acquire sound knowledge in the use of traditional and modern fish breeding methods, as well as some major aquaculture breeding programs.
- Gain skills in the evaluation of various breeding strategies.
- Understand quantitative genetics, epigenetics and chromosomes set manipulation of fish.

C5T: Fisheries Statistics, Economics and Marketing management .

Course outcome :

- The reader is going to be enlighted about statistics and it uses.Fisheries statistics is defined in this unit. The usage of statistics in the field of fisheries are explained.
- The reader is taught to calculate the different averages for the data. The merits and demerits of averages and its uses are explained.
- Improved decision making about things like fisheries production methods, fisheries input levels, and resource conservation, etc.
- Students should be able to communicate effectively, economic concepts, decision-making, and fisheries, and trade concepts.
- Students should have the skills to fit into a business, agency, or academic environment and use economic concepts to quantify and analyze issues related to their employer's issues.
- On completion this courses unit fisheries marketing management the students will have-
  - ➢ A clear understanding of the importance of economics in aquaculture development
  - ➢ A clear picture of the employment potential of the fishing industry
  - ➢ The ability to relate the socio-economics impacts with rural development
  - ➢ A deeper knowledge on the marketing of fishery products and export earnings.
  - ➢ The ability to contribute ideas towards planning for fisheries development in the country
  - ➢ A clear understanding of the role and effectives of the function of fisheries cooperatives

  in the country.

C6 T: Aquatic Ecology, Pollution And Biodiversity.

Course outcome:

At the end of this course, each student will be able to:

- Function of ecosystem,importance and conservation of different ecological niches.
- Sea safety and health management of fisheries community.
- Identify the chemical reactions and changes in contaminants
- Understand the microbiology and its usefulness to environment
- Perform experimental analysis of some properties of water ad wastewater.
- After successful completion of the course, students will be able to

1. Gain theoretical knowledge in hydrobiology, abiotic factors and aquatic organisms.
2. Know how aquatic organisms adapted during the course of evolution.
3. Comprehend the importance of estuaries, mangroves, marshes, wetlands and coral reef community. tidal flats, coastal.
4. Realize the impacts of aquatic pollution and how to use the biological strategies to prevent the pollution.
5. Know the basic concepts of biological productivity of both flora and fauna.
6. Gain the knowledge: how to collect, separate and classify planktons, and their importance .
7. Appreciate the economic importance of hydrophytes and halophytes.

C7T: Aquatic Microbiology, Fisheries Biotechnology And Bioinformatics.

Course outcome:

Upon completion of the course the students will have attained

- Greater insight into the molecular techniques and various gene manipulation techniques so that they could cater to the needs of the aquaculture sector and equipthemselves with the current advanced technologies for their future career development.
- Explain the interactions between microorganisms and fishes and factors influencing their growth and survival.
- Explain the significance and incidence of microorganisms in fishery environment.
- Describe the characteristics of food born and spoilage causing microorganisms in fishery products and methods for their isolation, detection and identification.
- To know the structure, classification, characteristics and economic importance of viruses bacteria and fungi.
- Knowledge gained:

Definition and History. to Basic Information Networks –Internet inBioinformatics.

Evolution of Bioinformatics – Scope –Potentials of Bioinformatics, Human Genome Project Introduction to Biological Databases: NCBI, EMBL, PIR, SWISS-Prot, PubMed.

Basic concepts of sequence similarity, identity and homology, definitions of homologues, orthologues, paralogues.

Sequence-based Database Searches: what are sequencebased database searches, BLAST and FASTA algorithms, various versions of basic BLAST and FASTA.

Skill Enhancement Course
SEC-1
Ornamental Fish Production And Aquarium Management.

Course outcome -

At the end of the course, the student will be able to:
- Apply information and practical experience in aquarium decoration;
- Learn about management, development, breeding and rearing of ornamental fish.
- Introduce species and variety of ornamental fish as well as aquarium management.
- learn and discover the factor related with biology, reproduction and management of types of ornamental fish.

CC-8: Fundamentals of Biochemistry, Fish Nutrition and feed Technology

Course outcomes :

- Student understand nutritional requirement of cultivable fishes and factors affecting energy partitioning and feeding.
- Know different types of feed and FCR and different types of feeders.
- Gain knowledge of feed manufacture and storage methods of feeds.
- Understand the value of feed additives and non-Nutrient ingredients.
- Understand the relationship between food, nutrition and health fish and shellfish.
- Having coherent and systematic knowledge on carbohydrate, lipid and amino acid metabolism.
- To create awareness of different nutritional deficiency and importance of supplementary feeds and balanced diet.

CC-9: Fisheries extension, cooperative and computer application

Course outcomes :

- Students understand the broad knowledge of scope and objectives, principles and features of fisheries extension education.
- Know about adaptation and innovations.
- Gain knowledge of basic concept of economics with reference to fisheries and various factors influencing the fishery products.
- Students know the basics cooperative and may help in formation of fisheries societies or cooperatives.
- Understand the importance of transfer technology of ICAR programmes and training at DAATT centers and their role in education of aqua farmers through print and electronic media.
- Know about fisheries extension, preparation of project and project appraisal.

CC-10: Marine fisheries, oceanography and coastal aquaculture

Course outcomes:

- Students know about the importance of coastal areas and can plan effective strategies to conserve it in case of any disaster.

- Students will know the available marine resource of India and means to protect it.
- To learn advanced fishing gear technology, design modification of existing fishing gears.
- Know about the development of shallow water and mudflat mariculture in different area.
- Under the concept of blue revolution, analyze the history and compare the present status of mariculture.
- Gain knowledge on Remote sensing application in fish finding and catching.
- To educate the students on the oceanographic concepts related to fisheries and impact skill to operate oceanographic equipment.
- Students know about the chemical and biological processes occurring in the ocean.

SEC -2: Fish breeding and hatchery management of carp/catfish/ prawn

Course outcomes:

- Demonstrate the different breeding techniques; explain growth promoters and live feed significance.
- Describe the various culture methods of carp, catfish and prawn.
- Acquire and apply knowledge on breeding ponds and hatcheries of finfish and shellfish.
- Design and explain working of hatchery; apply farm laboratory equipments use.
- Estimate and evaluate the functions of reproduction and endocrine glands.
- Investigate and apply hatchery technology for better management practices.
- Study on gonadial maturity and fecundity in fishes and shellfishes.
- Known about embryonic and larval development of fish.

CC-11: Fishing Crafts, Gears and Fishing Technology

course outcome:

- **Students are study the fishing crafts.**
- **Explain the going to be constructional the boats.**
- **Basic geometric concepts and important of fishing crafts and gears.**
- **Explain the significance of fish operation system.**
- **To know the structure of various commercial fishing gears.**
- **Studies on traditional fishing crafts operated in inland and marine fishing.**
- **Know the apply of modern fishing equipment.**

CC-12: Post Harvest Technology, Fish and Aquaculture Products and Bi-Products

COURSE OUTCOMES: Upon completion of the course the students will have attained

- **Know how post harvest technology.**

- Appreciate the sanitation and plant housekeeping, chilling and freezing equipment, instruments, packages and products styles.
- Explain the significance and incidence fish by-products.
- Know how to biochemical and pharmaceutical products.

DSE-1: Fisheries Biotechnology, Bioinformatics and Statistics
COURSE OUTCOMES:

- Greater insight into the molecular techniques and various gene manipulation techniques so that they could cater to the needs of the aquaculture sector and equipthemselves with the current advanced technologies for their future career development.
- Explain the interactions between microorganisms and fishes and factors influencing their growth and survival.
- Students are know how to be enlighted about statistics and it uses. Fisheries statistics is defined in this unit. The usage of statistics in the field of fisheries are explained.
- They are taught to calculate the different averages for the data. The merits and demerits of averages and its uses are explained.
- Improved decision making about things like fisheries production methods, fisheries input levels, and resource conservation, etc.
- Students should be able to communicate effectively, economic concepts, decision-making, and fisheries, and trade concepts.
- Students should have the skills to fit into a business, agency, or academic environment and use economic concepts to quantify and analyze issues related to their employer's issues.

DSE-2: Post-Harvest Technology and Quality Assurance of Fishery Products

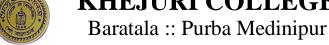**COURSE OUTCOMES:** At the end of this course, each student will be able to

- Students can appreciate the importance of post harvest technology.
- Study the quality assurance of fishery products.
- The concept is going to HACCP safe products production.
- Know the MPEDA.
- Improved decision making waste management in seafood processing.
- Assessment of quality of fresh fish by sensory, biochemical and instrumental methods.

CC-13: Fish Disease, Immunity and Health Management

At the end of the Coure the studente will be able to -

i) Impart the complete knowledge about the different

finfish & shellfish disease.

ii. To understand the disease surveillance ana reporting, quarantine, sanitary and phytosanitary agreement,biofilm,biofloc and periphyton.

iii.Gain the knowledge about the disease development process, Pathogencity mechanism of parasite, bacteria, virus and fungus.

iv. тo understand the important disease problems of cultured shellfish, finfish & their control.

V. To understand the antigen, antibody, MHC complex, immunity, macrophages & vaccine.

CC-14: Population Dynamics and Stock Assessment and Therapeutics in Aquaculture

After completion of this coure, students can understand and evaluate the following area-

i.   The concept of population, unit stock, maximum sustainable yield, maximum economic yield, yield in number, yield in weight, yield per recruit, field curve, yield in models.

ii.   Biological structure of fisheries resource in Space & time.
iii.   Principles of stock assessment, population age structure, theory of life table.
iv.   Estimation of total fishing and natural mortality.
v.   Scope & current scenario of therapeutics in aquaculture.
vi.   Drugs used in aquaculture with therapeutics.
vii.   Drug formulation for aruaculture.

DSE-3: Fisheries Economics , Fisheries Policy and Laws and Entrepreneurship Development

After Successful   completion of this course, Students the will be able to

i.   To Understand the Micro & macro economics, farm- firm relationship, profit maximization, farm planing & budgeting, consumer surplus, demand, supply, utility and elasticity.
ii.   To understand the the production contribution of fishheries sector to the economic development of the country.
iii.   To understand the central & state responsibilities for fisheries development.
iv.   To understand the water Act, Air Act, Environmental (protection) Act, and Indian fisheries Act.
v.   To understand entrepreneurship development programs, venture capital, contract farming & Joint venture, public-private partnership & overview of fisheries input industry.

vi.   To understand the Goverment schems and incentives for promotion of entrepreneurship.

DSE-4: Training / Project Work

At the end of the course, the student will be able to

i.   To understand practical knowledge of the aquaculture field.
ii.   Project work will motivate to engage in different research oriented job.
iii.   Impart the complete knowledge about research.