



**PVKN GOVT COLLEGE (A)CHITTOOR
CERTIFICATE COURSE IN PISCICULTURE**



PVKN. GOVT.COLLEGE (A),CHITTOOR

[ACCREDITED WITH A GRADE BY NAAC]

PROPOSAL FOR CERTIFICATE COURSE ON PISCICULTURE

**By
DEPARTMENT OF ZOOLOGY
Session 2022- 2023**

S.No.	RESOURCE PERSONS	DESIGNATION
1	Dr. P. SUDARSANAM M.Sc., Ph.D.,	LECTURER IN ZOOLOGY
2	Smt.C.KOMALA DEVI M.Sc.,B.Ed	LECTURER IN ZOOLOGY

PVKN GOVT.COLLEGE(A),CHITTOOR
IQAC -Resolution Copy

The IQAC committee along with Chairperson and Coordinator, convened a meeting on _____OCTOBER 17-2022_____ and resolved to conduct “ Certificate//Value Add-on courses “ in the month of _NOVEMBER 2022_____ according to the feasibility of the departments.

It is also resolved to submit the details as per the checklist well in advance by the departments who had given their consents.

Check list:

- 1. IQAC Resolution**
- 2. Department wise Resolution**
- 3. Course structure and planning**
 - a. Date and timing schedule**
 - b. Course out comes, Syllabus and model question papers**
 - c. Testing procedure**
 - d. Feedback form**
 - e. Model Certificate**
- 4. Students' enrolment list**
- 5. Attendance register for 30 hours and more (Online/ Offline)**
- 6. Audio visual Aids (if available), PPTs, Handouts/ Printed material**
- 7. Test(Exam) and Certificate distribution**
- 8. Submission of Critical Analysis Report to IQAC**

Date: 19-10-2022

Place: Chittoor.

PVKN GOVT COLLEGE (A), CHITTOOR

**Department of Zoology
Resolution**

We the department of zoology conducted a meeting on 19-10-2022 at 10:40 AM to discuss about introducing of a certificate course entitled “PISCICULTURE”. As the students of zoology well known about physiology, morphology physiological activities of various fishes and their related diseases and their prevention. Hence this course will enhance their knowledge regarding pisciculture more over it is one of the demanded field, hence we chosen to establish a certificate course on pisciculture.

Signature of the Head of the department

Faculty members

- 1) Dr. M. Thejomoorthy
- 2) Dr. P. Sudarsanam
- 3) Sri. P. Navaneeswara reddy
- 4) C. Komala devi

Notice Board

The department of Zoology is going to conduct a certificate course on “PISCICULTURE” from 1-11-2022 with min 30 working hours. Interested candidates should come and register your names in the department on and before 28-10-2022

Time table for Pisciculture (certificate course for the year of 2022-2023)

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Timings	9:00-9:50 AM	9:00-9:50 AM	9:00-9:50 AM	9:00-9:50 AM	9:00-9:50 AM	9:00-9:50 AM
Lecturer	Dr.PSN	CKD	Dr.PSN	CKD	Dr.PSN	CKD
Venue	Zoology lab-II Room no: 47	Zoology lab-II Room no: 47	Zoology lab-II Room no: 47	Zoology lab-II Room no: 47	Zoology lab-II Room no: 47	Zoology lab-II Room no: 47

Signature of the HOD
Principal

Signature of the Coordinator

Signature of the

INTRODUCTION TO THE PROGRAMME

Pisciculture is the process of rearing, breeding and harvesting of fish species in controlled aquatic environments like the sea water, lakes, rivers, ponds and streams. It serves different purposes, including food production, restoration of threatened and endangered species populations, The Aims of the Pisciculture is mainly the production of Fish for human food because of high nutritional value.

Scope of Pisciculture

- Increase Food Supply
- Provide aqua food which are rich in protein
- Provide employment Opportunity

The present programme aims to provide basic knowledge of pisciculture because it provides employability in local level. Scheme of certificate in pisciculture will be introduced for Session 2018-2019. This course is offered by the PVKN Govt. College (A) College, Chittoor

The syllabi and scheme of examination are detailed below:

Minimum Duration: 30 hours

Eligibility: 12 (intermediate passed) from any recognized secondary Education board of any state of India.

Medium of instruction: English

The Certificate in Aquaculture Programme is offered by Department of Zoology PVKN Govt. College (A) College, Chittoor.

Maximum Age: 23 years

Minor component of the evaluation system

Assignments:

Submission of assignments is compulsory. Assignments of a Course carry 30% weightage. Student will have to submit one assignments. Students will not be allowed to appear for the final examination for a CE, if they do not submit the assignments in time. If student do not get a passing mark in any assignments student have to submit it again.

Major component of the evaluation system

Theory Paper: -

Theory paper carries 50 marks in the final result.

In case, student fail to secure a pass score (40% marks) in the final examination, student will be eligible to reappear in the next year final **examination for CAQ**

Evaluation

Evaluation consists of two parts: 1) assignments, and 2) final Examination. In the final result, assignments carries 20% weightage, while 80% weightage is given to final examination, Following is the scheme of awarding divisions and grades:

Division	Marks range	Grade
First	40 and above	A - Excellent ..
First	30-39	B- Very Good
Second	25-29	C - Good
Pass	20-24	D - Satisfactory
Unsuccessful	Below 20	E - Unsatisfactory

Students are required to score at least 40% marks in assignments as well as final examination separately. **In** the overall computation also, you must get at least 40% marks to **claim** the Certificate in Aquaculture.

EVALUATION PATTERN

Theory Paper		
Paper-1	Pisciculture	50 Marks

SYLLABUS AND MARKING SCHEME

Paper No.	Title of the Paper	Marks allotted
		Theory
I	Pisciculture	40
II	Assignments	10
Total		50

Course objectives:

- 1) The contribution of good protein for the national population.
- 2) It is also helpful for economic development of India.
- 3) It is also useful to solve waste management problem.
- 4) It is also control the pollution problem.
- 5) Healthy culture of the fisheries helpful for the Indian growth with healthy life.

Course outcomes:

- 1) Students able to learn different fish culture like fish cum poultry, integrated fish culture and ornamental fish culture.
- 2) Students able to understand conventional and non conventional harvesting methods of Aquaculture.
- 3) Students gain knowledge about different diseases that are infecting fishes like bacterial, viral and fungal.

Max. Marks:50

Unit -1 Types of Fish culture

10 hr

- 1.1) Fish cum Poultry culture
- 1.2) Integrated Fish culture
- 1.3) Ornamental Fish culture

Unit -2 Fish Harvesting Techniques

10 hr

- 2.1) Conventional Methods: Introduction, Fishing Gears, Nets, Hook and line gear
- 2.2) Un-Conventional Methods: Electro-Fishing, Light Fishing

**Unit – 3
Fish Pathology**

- 3.1) Inflammation
- 3.2) Viral Diseases, Bacterial diseases,
- 3.3) Fungal Diseases Protozoan, Helminthes
- 3.4) Nutritional Deficiency diseases and their control

References:

- 1. A text book of Fishery Science & Indian Fisheries C.B.L. Shrivastava.
- 2. A text book of fish biology and Indian Fisheries by Rahul P. Parihar, Central Publishing House, Allahabad.
- 3. An Introduction To Fishes by S.S. Khanna, Silver Line Publication Allahabad.
- 4. General and applied Ichthyology (Hishabd Fisheries) by S.K. Gupta, P.C.Gupta., S.Chada & Co. Ram Nagar, New Dehi.
- 5. A text book of Fish Biology and Indian Fisheries by Rahul P. Parihar, Central Publishing House, Allahabad

Integrated FISH Farming System:

Integrated farming may be defined as a sequential linkage between two or more farming activities. When the fish becomes a major commodity of this system it is known as integrated fish farming (IFF). Thus, the practice of Combining Fish Culture with Agriculture or livestock for full Utilization of resources and increased production is commonly known as Integrated Fish Farming. Integrated fish farming is based on the concept that 'there is no waste', and waste is only a misplaced resource which can become a valuable material for another product (FAO, 1977). In integrated farming, the basic principles involve the utilization of the synergetic effects of inter-related farm activities and the conservation, including the full utilization of farm wastes. It is assumed that all the constituents of the system would benefit from such a combination. However, in most cases, the main beneficiary is the fishes which utilizes the animal and agricultural wastes directly or indirectly as food. As integrated farming involves the recycling of wastes, it has been considered an economic and efficient means of environmental management.

PROSPECTS /Advantages of IFF:

They include efficiency in resource utilization, efficient utilization of wastes from other culture practices, reduction in risks by diversifying crops, recycling of wastes/ by products of one farming system as input for another system, efficient utilization of available farming space for maximum production, additional source of food and income, a reduction in additional cost for supplementary feeding & fertilization. In fact, IFF is an artificial balanced ecosystem without any waste. It generates more avenues for employment; it reduces the input and increases output and economic efficiency. IFF provides fish, meat, milk, vegetables, fruits, fodder, eggs, grains, & mushroom etc. Altogether, IFF has enough potential for rural livelihood & socio-economic status. Integrated fish farming has received attention in recent years in the North East India. Among the different livestock based system, fish duck integration is one of the most popular farming practices among woman fishers.

Advantages of Fish -Duck Integration:

Duck dropping act as feed and fertilizer for cultured fish in the pond.

- Duck collect 50% of their food naturally from the pond.
- Ducks keep the water body clean and increase dissolved oxygen by doubling action.
- Duck house can be constructed at the embankment or over the water surface, hence no need of extra place for it. Left over feed of duck used as supplementary feed for fish.
- Production of duck eggs, meat, fish and horticulture from the same unit area.

1. Selection of fish species:

- In this integration, fish species selection is one of the important point, where plankton feeder should be 60% and omnivorous should be 40%.
- A combination of six species viz, Catla (20%), Silver carp (20%), Rohu (20%), Mrigal (15%), Grass carp (10%) and Common carp (15%) should be stocked at density of 8000 to 8500 fingerlings/ha for the targeted production level of more than 3500 kg/ha. Such integration is suitable only for rearing and stocking ponds where fishes are above 12 gm.
- Selection of duck and their maintenance Some important varieties of ducks are Nageswari, Sylhet Meat, Indian Runner, Serachameli and Khaki Campbell. Out of this varieties, Khaki Campbell crossed with local pati variety is the best in Assam condition.
- It should be collected from the Government Farm and then consult with the veterinary• Doctor for treatment and preventive measure of some epidemic disease like Duck Plague, Cholera etc.
- Ducks are stocked @200-300 ducklings/ha of fish pond. From duck excreta annual• manure production is 45-55 kg/duck/yr, which besides fertilizing the fishponds and can be directly utilized as fish food. Apart

from this, 10-20% feed/day/duck is wasted which is utilized in ponds. Duck dropping contains 81% moisture and 0.91% N and 0.38% P₂O₅.

- Duck-house Duck house should be made on the pond dyke or over the pond surface with the help of locally available material such as bamboo cane, thatches etc.
- In case of duck house over the pond surface, a small bamboo bridge is constructed from the duck house for feeding the ducks as well as for collecting eggs and duck from the house. Another bridge is constructed from the duck house to the pond surface for helping the ducks ascend or descend to pond water.
- Again duck house should be well ventilated for air circulation and exposed to direct sunlight. Periphery of the pond should be fenced for protection of ducks. Ducks are kept in duck house providing about 0.3-0.5 m²/bird. Again one male duck should be kept in every 5-6 female ducks. Ducklet especially up to 3-4 weeks old are very susceptible to disease, hence, care should be taken within this period

Duck Feed:

- Mostly fine rice bran and poultry feed (layers mash etc.) are used as duck feed at the rate of 100 gm feed/day/duck.
- Duck feed should be stored at cool and dry environment. If possible, manganese sulphate mixed with feed gives the better result at the rate of 10gms/100kg of feed. Apart from that Duck weeds (Lemna, Wolfia, Azolla etc.) are also fed to the ducks.
- Duck also consume tadpoles, juvenile of frogs and dragon fly larvae. Further protein content in natural food organisms of the ponds consumed by duck is high. Therefore, the duck reared in fishponds save the cost on protein substantially in duck feeds and gives more eggs in comparison to duck which are not allowed in fishponds. The left over

feed given to the ducks and duck dropping fulfil more than 59% of food requirements of farm fishes. Sometime algal bloom may increase, then duck dropping should be stopped periodically by using plastic at the bottom of the duck house and removed

- Lime application In this integration except basal manure there is no need to apply inorganic and organic manure from the outside during the culture period. Only lime is applied at the rate of 250-300 kg/ha/year at suitable intervals. Production By this integration a production of 3500-4000 kg of fish, 18000-18500 eggs and 500-600 kg duck meat from 1 ha of pond area in 1 year without any supplementary feed and fertilizers can be obtained and the cost is turned down to 60% lesser than normal.

Fish-Cum-Poultry Farmings:

Integrated fish farming with poultry is generally cultured as the poultry manure is a very efficient fertilizer for fish ponds. The poultry droppings comprises 2% nitrogen, 1.25% phosphoric acid and 0.75% potash. The low feeding cost per individual bird makes poultry farming along with fish, a common investment for poor farmers.

(a) Poultry Raising: Both 'broilers' and 'layers' variety of chicken can be raised for fish-poultry farming. One day old chick are raised up to the pullet stage after which they are put in layer cages.

Fish culture with both intensive and extensive poultry productions have been integrated successfully. The most intensive type of poultry production is the battery type of housing, which is installed by the side of the pond. The floor of the house is cemented and is set up at a slope so that the eggs may roll forward.

For layers, the floor area required is about 30 cm² while for broilers, 15-20 cm². The usual floor space allotted for each bird is 20 x 30 x 40 cm. The birds are confined to cages which are made up of standard, stout, galvanised wire.

The cages are kept on trays for collection of droppings.. For manuring one hectare pond water, the droppings of about 250 layers and four batches of 200 broilers each are adequate in a year's time.

(b) Fish Raising:

For fish raising the ponds are stocked with fingerlings of catla, silver carp, common carp, murrels, tilapia, giant freshwater prawns, etc. The stocking density of fishes is related with that of poultry and also with the period of culture.

In one hectare pond area, when stocked with 5000 giant freshwater prawns (*Macrobrachium rosenbergii*) and 1500 silver carp, and cultured for a period of four months, one can harvest 600 kg of prawns and an equal amount of fish, along with 250 culled birds.

For culturing over a period of one year, ponds may be stocked with fingerlings of catla, common carp, silver carp and grass carp at a density of 5000-6000 fingerlings per hectare. At the end of twelve months of fish-cum-poultry culture, fish yield of over 3900 kg per hectare can be normally obtained along with 42,000 eggs and 200 culled birds.

Advantages and disadvantages of fish-cum- poultry culture:**(i) Advantages:**

- (1) Chicken manure is a very efficient fertiliser, so no chemical fertiliser is needed for fertilising the pond water. This cuts down the expenditure of rearing fishes.
- (2) No supplementary fish feed is required.
- (3) The purchase and feeding cost per bird is low.
- (4) Chicks are readily available and their productivity can be improved with simple and cheap management.

(ii) Disadvantages:

- (1) Chicks should be examined from time to time and diseased one should be isolated, otherwise they will destroy the entire stock.
 - (2) Sufficient time should be given from one stocking of chicks to the next for renovation of the house and disinfectioning it.
- Rice - Fish Integrated Farming System

FISH DISEASE AND THEIR REMEDIAL MEASURES

Introduction:

Fish diseases, in various forms have been tormenting the aquaculturists ever since man learned the art of fish husbandry. The stability of a fish population in particular habit is very often disrupted by various factors viz., disease, habitat destruction, depletion of resources or other application of environmental stressors.

Fish is in a State of equilibrium with the environment and a change in the environment parameters beyond the tolerance limit disturbs the equilibrium resulting in stress response in fish and making it valuable to fish disease.

It should be understood that fish suffer from many diseases, of which from causative point of view they are classified as follows:-

- (a) Non- parasitic infection by environmental stresses e.g.gas disease.
- (b) Parasitic infection by Fungi, bacteria, protozoa, worms and crustacean.

Common fish diseases, their symptoms and control/ remedial measures:

Specific fish Disease	Symptoms	Control/remedial measures
Non – parasitic infection Environmental diseases Gas disease (air embolism)		

Depletion of oxygen	Mouth remains open, small bubbles beneath the skin, Gills look pale.	Aeration of water areas, growth of water hyacinth..
Growth of algae	Pond water turns green, fishes gape for like respiration	Sprinkling of raw cow dung, growth of water hyacinth
Increase of hydrogen sulphide	Pond bottom / muck smells like rotten eggs resulted in choking respiratory	Raking of pond bottom and change of water.
Excess of CO ₂ or high P h of water	Excessive secretion of mucus by gills and body surface.	Aeration of pond/ water areas.
Parasitic infection Fungal disease	Infects fry, fingerlings & adults becomes weak and lethargic, ulceration of skin, blindness, tufts of minute white hair-like outgrowth in affected parts.	Dip treatment in 3% common salt for 5- 10 mins. - 1:2000 parts of copper sulphate (CuSo ₄) for 5- 10 mins. - 1:1000 parts of Potassium permanganate (KMno ₄) for 5-10 mins until fish shows distress. –
Gill rot	Gill becomes greyish-	Apply about 100 kgs/ ha

	<p>white may finally drop off occurs during hottest time of the year.</p>	<p>quick lime in the pond - 3-5% common salt bath for 5 mins. - 5: 1000 parts KMno, bath for 5-10mins. -8-12kgs/haCuSo4 applied in pond</p>
<p>Bacterial diseases Fin and tail rot</p>	<p>White line appears in margin of fin and spreads to all parts of the body.</p>	<p>1,2000 parts of CuSo4 for 1-2 mins – Painting/intense application the affected part by CuSo4 also helps</p>
<p>Ulcer</p>	<p>Sores and ulcers appear in the body. Increases in size, gradually expose the muscles.</p>	<p>Badly infected fish be destroyed - 1:1000 parts of KMno4 applied in pond. - 1:2000 parts CuSo4 dip treatment for 1min for 3-4 days</p>
<p>Dropsy</p>	<p>Accumulation of fluid inside the body cavity, scales protrudes</p>	<p>- 1:1000 parts KMno4 disinfect the pond - 5:1000 KMno4 dip treatment for 3 mins - 60 mg Chloromycetin in 4.5 ltr water bath the infected fish</p>

<p>Eye disease</p>	<p>Infects eye, optic nerves, brain of fish mostly Catla.</p>	<p>Initial stage Chloromycetin 8- 10 mg/ltr bath for 1 hour for 2- 3 days - Disinfect pond by 1:1000 parts KMno4</p>
<p>Protozoandiseases Trichodiniasis</p>	<p>Eye becomes opaque eyeball bursts. Pale colour of gills with a coating of cram layer of mucus.</p>	<p>- Terramycin 100 mg / kg feed applied during 3 days. - 3-5% common salt bath hourly for 1 week. - 1:5000 parts formalin treatment in pond/ dip hourly for 7-10 days.</p>
<p>White gill spot disease</p>	<p>Gills covered with white spots like pox.</p>	<p>3-5% common salt bath for 5-10 mins. - Decreasing density of fish from affected pond. - 3-5% common salt solution bath for 5-10 mins.</p>

Black spot disease	Black oval shaped patches and nodules on body.	- Removal of moluscan population from water areas.
Ligulosis (tapeworms)	Abdomen enlarges abnormally and body becomes dark.	- Removal of birds from around affected areas.

Crustacean diseases Lemaecosis	By anchor worms, buried deep in host tissue, rubbing against pond dykes or even bottom, becomes lethargic.	Gammaxene @ 1 ppm application in the pond.
Ergasilosis	Irritation in gills and fins.	- 5% common salt bath to the affected fishes.
Argulosis	Parasites visible on gills and body surface	- Removal of eggs of Argulus by hanging corrugated sheets in water and removing them and drying after a week to kill eggs

❖ **Conventional methods of fish harvesting:**

- **Fishing nets:** These are walls of netting that hang in the water with meshes designed to entangle the fish's gills.
- **Seine nets:** These nets are used in pairs, with one end held by a boat and the other onshore. The net is then pulled to shore, trapping fish in between.
- **Fishing hooks and lines:** A single fishing line with a hook and bait is used, often from the shore or a boat.
- **Long lining:** A long line with multiple baited hooks is set in the water, and after a certain period, it is retrieved.
- **Traps and pots:**
 - **Fish traps:** Various types of traps are used to entice fish and then prevent them from escaping once inside.
 - **Fish pots:** These are cages or pots with openings that allow fish to enter but not exit.
- **Spears and Harpoons:**
 - **Spearm fishing:** Divers use handheld spears to catch fish underwater.
 - **Harpooning:** This method is often used for larger fish. A harpoon is thrown or thrust into the fish from a boat.
- **Traditional fishing:**
 - **Hand netting:** Small hand-held nets are used to scoop fish from the water.
 - **Angling:** The use of a fishing rod with a line and hook, often for sport fishing but also for subsistence.
- **Dredging:**
 - **Bottom trawling:** This involves dragging a large net along the seabed, capturing fish and other marine life.
- **Fish weirs and Fences:**
 - **Fish weirs:** Enclosures or barriers are created to direct fish into a confined space where they can be easily caught.
 - **Fences:** Similar to weirs, these are fences that guide fish into a trap.

- **Electro fishing:** Electricity is used to temporarily stun fish, making them easier to catch. This method is often used for scientific research and fish population management.

- **Traditional indigenous methods:** Many indigenous communities have their own unique and sustainable methods of fishing, often passed down through generations.

- ❖ **Non-conventional fish harvesting methods:**
 - **Aqua culture fish farming:** Instead of catching fish in the wild, aquaculture involves the cultivation of fish in controlled environments such as ponds, tanks, or cages. This method provides a more controlled and sustainable way of obtaining fish.

 - **Hydro acoustics:** This involves using sonar technology to locate schools of fish underwater. The information gathered can be used to direct fishing operations to specific areas with higher fish concentrations.

 - **Drone fishing:** Drones equipped with cameras can be used to locate schools of fish from the air. Some advanced drones even have the capability to drop baited lines or nets into the water.

 - **Fish aggregated devices (FAD):** Floating structures or devices are deployed in the open ocean to attract fish. FADs often enhance fishing efficiency by concentrating fish in a particular area.

 - **Under water drones:** Submersibles or remotely operated underwater vehicles (ROVs) equipped with cameras and sensors can be used to monitor fish behavior and populations underwater. This information can guide fishing operations.

 - **Laser fishing:** Experimental techniques involve using lasers to stun fish momentarily, making them easier to catch. This method is still in the early stages of development.

- **Fish ladders and bypass systems:** In areas with dams or other barriers, fish ladders and bypass systems are designed to help fish migrate upstream to spawn, allowing for more sustainable harvesting practices.
- **Selective fish gear:** Devices such as size-selective grids on trawl nets can allow smaller or non-target fish to escape, reducing bycatch and promoting more sustainable harvesting.
- **Robotic fish harvesters:** Emerging technologies include the development of robotic devices that mimic fish behavior to attract and catch fish. These robots can be remotely operated or autonomous.

Date: 17-12-2022

Place: Chittoor

PVKN GOVT COLLEGE (A), CHITTOOR
Department of Zoology
Certificate Course for the academic year 2022-23 Examination Notice

All the students enrolled for certificate course "**Pisciculture**" are here by informed that, their certificate course Examination will be held on 22/12/2022 on 9:00am to 9:50am at Zoology lab. The question paper contains 20 multiple choice questions each question carries 2 marks. 1 hour duration will be given to the enrolled candidates only. Do attend the Exam in time.

Test questions:

Q1). Aquaculture is the farming of.. ()

- (a). Fishes and crustaceans.
- (b). Mollusks.
- (c). Aquatic plants.
- (d). All of the above.

Q 2). Which is the largest fish harbour in India? ()

- (a). Koyilandy fish harbour in Kerala.
- (b). Versova fish harbour in Maharashtra.
- (c). Mangrol fish harbour in Gujarat.
- (d). Karaikal fish harbour in Tamil Nadu.

Q 3). What is the share of fresh water fish culture in total fish production?

()

- (a). 40%.
- (b). 50%.
- (c). 55%.
- (d). 45%.

Q4). Which one is not the objective of aquaculture? ()

- (a). Production of ornamental fish for aesthetic purpose.
- (b). Production of nutritive and healthy food.
- (c). Replace the old species of fishes.
- (d). Recycling of organic waste

Q 5). Which one of the following is the largest fresh water lake in Asia?

()

- (a). Caspian sea.
- (b). Wular lake.
- (c). Dead sea.
- (d). Aral sea.

Q 6). Which is brackish water body? ()

- (a). Lagoon.
- (b). Sea atoll.
- (c). River delta.
- (d). All of the above.

Q7). Which is a shrimp? ()

- (a). *Mugil cephalus*.
- (b). *Penaeus monodon*.
- (c). *Macrobrachium vollehenovienii*.
- (d). None of the above.

Q 8). Which is prawn? ()

- (a). *Scylla serrata*.
- (b). *Mugil cephalus*.
- (c). *Macrobrachium rosenbergi*.
- (d). All of the above.

Q 9). Which is an example of euryhaline? ()

- (a). Mullet.
- (b). Mud skipper.
- (c). Penaeids.
- (d). All of the above.

Q 10). Which is an example of shellfish? ()

- (a). Mussels.
- (b). Oysters.
- (c). Scallops.
- (d). All of the above.

Q 11). Central Institute of Fisheries Education.... ()

- (a). Kolkata, West Bengal.
- (b). Jamnagar, Gujarat.
- (c). Cuttack, Odisha.
- (d). Mumbai, Maharashtra.

Q 12). Central Institute of Freshwater Aquaculture.... ()

- (a). Bhubaneswar, Odisha.
- (b). Tiruvanathapuram, Kerala.
- (c). Puducherry, Tamil Nadu.
- (d). Kozhikode, Kerala.

Q 13). Central Marine Fisheries Research Institute.... ()

- (a). Mangalore, Karnataka.
- (b). Cochin, Kerala.
- (c). Daman.
- (d). Puri, Odisha.

Q 14). Central Inland Fisheries Research Institute.... ()

- (a). Palghar, Maharashtra.
- (b). Kanpur, Uttar Pradesh.
- (c). Barrackpore, West Bengal.
- (d). None of the above.

Q 15). Central Institute of Fisheries Technology. ()

- (a). Mumbai, Maharashtra.
- (b). Paradeep, Odisha.
- (c). Diu.
- (d). Cochin, Kerala.

Q 16). National Bureau of Fish Genetic Resources. ()

- (a). Lucknow, Uttar Pradesh.
- (b). Patna, Bihar.
- (c). Indore, Madhya Pradesh.
- (d). Nagercoil, Tamil Nadu

Q 17). The term aquarium was coined by. ()

- (a). Tasso Tayung.
- (b). Philip Henry Gosse.
- (c). Schaefer.
- (d). None of the above.

Q 18). kreisel is a type of aquarium which is best for. ()

- (a). Star fish.
- (b). Jelly fish.
- (c). Prawns.
- (d). Gold fish.

Q 19). Who develop the first modern aquarium made of glass was developed in the 19th century by ()

- (a). Philip Henry Gosse.
- (b). Leonhard Baldner.
- (c). Robert Warrington.
- (d). Anne Thynne.

Q 20). Aerenchyma is the modification of parenchyma which gives special adaption to.. ()

- (a). Cyanobacteria.
- (b). Zooplankton.
- (c). Phytoplankton.
- (d). Aquatic plants.

Department of Zoology
Certificate course on Sericulture

Student Enrolment list:

S.No.	Name of the Student	Group	Class/ Year	Signature
1.	A. KAVYA	III BZC	III B.Sc	A. Kavya
2.	BK. Swetha	II BZC	II BSc	B.K. Swetha
3.	B. Prasanna	II BZC	II BSc	B. Prasanna
4.	C. KAVYA	III BZC	III BSc	C. Kavya
5.	DN. SONIYA	III BZC	III B.Sc	D. N. Soniya
6.	G. DIVYA	III BZC	III BSc	G. Divya
7.	G. Vijaya Vani	III BZC	III BSc	G. Vijaya Vani
8.	J. Mounika	III BZC	III BSc	J. Mounika
9.	K. Swapna	III BZC	III BSc	K. Swapna
10.	K. Thilak	III BZC	III BSc	K. Thilak
11.	K. Bhavya	III BZC	III BSc	K. Bhavya
12.	K. Supriya	III BZC	III BSc	K. Supriya
13.	M. Guna sekhar	III BZC	III BSc	M. Gunasekhari
14.	P. Abubakar Siddiq	III BZC	III BSc	P. Abubakar Siddiq
15.	R. Yamini	III BZC	III BSc	R. Yamini
16.	S. poojitha	III BZC	III B.Sc	S. Poojitha
17.	S. Gousiya	III BZC	III B.Sc	S. Gousiya
18.	T. poojitha	III BZC	III B.Sc	T. Poojitha
19.	T. Reddemma	BZC	III B.Sc	T. Reddemma
20.	V. Sneha	BZC	III B.Sc	V. sneha
21.	V. Surya chandra prakash	III BZC	III B.Sc	V. Surya chandra
22.	B. Divya	BZC	III BSc	B. Divya
23.	D. pavithra	III rd BZC	IV th BSc	D. Pavithra
24.	I. Soumya	II BZC	III B.Sc	I. Soumya
25.	K. Nithin			

Critical Analysis Report:

The Department of Zoology has been conducted a certificate course (Institutional Permission) on "PISCICULTURE" from 01-11-2022 to 17-12-2022 with the minimum duration of 30 hours. According to the IQAC and Principals instruction the course have been started the feasibility and convenient of the hours for this academic year. The total students 30 were registered for this course and completed as per the schedule. The objective of the course was fulfilled by acquiring of PISCICULTURE .

Outcomes of the Course:

1. Students can able to understand Pisciculture
2. Students can able to basic knowledge on Pisciculture
3. Students can able to Imparting basic knowledge in the organic farming
4. Students can able to equip the candidates to meet the demands by self-farming
5. Students can able to be aware of the personal and environmental effects of chemical fertilizers

Hence, the certificate course is very useful to B.Sc., Students on Pisciculture. The feedback from students were collected and analyzed. All the students from Pisciculture showed interest to do such type of Certificate course and to continue it for further years also.

Course feedback form:

1. Were objectives of the course clear to you

- 1) Yes 2) No

2. The course contents met your expectations

- 1) Yes 2) No

3. The level of the course was

- 1) Good 2) Not Good

4. The contents were illustrated with

- 1) More examples 2) Few examples

5. The course exposed you to new knowledge and practices

- 1) Agree 2) Not agree

6. Will you recommend this course to your next Batch

- 1) Yes 2) No



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