MAHISHADAL RAJ COLLEGE
(Govt. Sponsored)
NAAC Accredited 'A' Grade College
DST (FIST) Govt. Of India approved College, NSDC Training Partner
Estd. : 1946
Mahishadal : Purba Medinipur Phone STD 03224 No. 240220

Ref. No..... Date:

ADD ON COURSE 2019-20

Organised by Department Zoology

Topic: Ornamental-Fish Breeding

Add on course summary:

REPORT:

Name of the course- Ornamental-Fish Breeding

Course coordinator: *Dr. Shubhamoy Das*, (Associate Professor, HOD, Department of Zoology , Mahishadal Raj College)

Date of commencement: 01.11.2019

Date of completion: - 19.11.2019

Number of participant enrolled: 30

Total duration day: 15

Total duration hour: 30

Evaluation method:- Paper pen MCQ and practical work

RESULT DETAILS:-

Number of student participate in this program: 30

Number of student completes this program: 29

Number of student got certificate in this program: 29

Name of the course: Ornamental-Fish Breeding

Course coordinator: *Dr. Shubhamoy Das*, (Associate Professor, HOD, Department of Zoology , Mahishadal Raj College)

Ornamental-Fish Breeding

- **About the course:**

  The certificate course in Ornamental Fish breeding and aquarium keeping is intended to create interest in the breeding and rearing of aquatic organisms and plants in controlled conditions. Aqua Farming/ Ornamental Fish Farming provides alternative livelihood opportunities for the socio-economic upliftment of society. The entrepreneurship possibilities through ornamental fish farming aregetting popular in the present scenario. Hence, Ornamental Fish breeding and aquarium keeping Courses will create awareness and promote green aquaculture involving environmental-friendly practices.

- **Learning outcomes:**

Participating in an ornamental fish breeding and aquarium keeping course can open doors to a range of opportunities, whether for personal enjoyment, professional development, or business endeavors. Some potential opportunities that such a course can provide:

- Student enables to set up aquarium.
- Studentsare enabled to manage the home as well as commercial aquariums.
- Students will learn to handle different aquarium equipment.
- Students will learn Decorations of aquarium
- Students will learn Breeding of Aquarium Fishes.
- Students' knowledge about various techniques of ornamental fish breeding, rearing, and marketing to make them self-sustainable after completing the certificate course.

- **Target audience:**

Any branch of life sciences students (UG and PG), research scholars, and faculties.

- **Course content overview:**

To impart hands-on training on feed and feeding technology
To impart hands-on training on setting up of aquaria and maintenance
To generate export-oriented employment in rural and urban households through ornamental fish production.
To impart hands-on training on the culture, and breeding of commercially important ornamental fishes
To mass-produce a large number of varieties of ornamental fish species to create a large supply of ornamental fish and increase the overall exports.
To promote employment and entrepreneurship in the ornamental fish sector by graduates in fisheries, aquaculture, and biological sciences

- **Schedule:** Total 30 hours

DAY	SCHEDULE
Day 1	Basics of aquaculture and scope. History of aquaculture: Present global and national scenario. (2 hours)
Day 2	Ornamental fisheries-e new dimensions in aquaculture entrepreneurship. (T + P) (2 hours)
Day 3	Introduction to aquarium and aquarium accessories. Basic knowledge on profile of ornamental fishes in world. (T + P) (2 hours)
Day 4	Identify, classify and describe an aquarium fishes (T + P) (2 hours)
Day 5	Brood fish collection and rearing. (T + P) (2 hours)
Day 6	Introduction to Aquarium plants and their export potential. (T + P) (2 hours)
Day 7	Management of ornamental aquatic plants and its trading (T + P) (2 hours)
Day 8	Breeding of ornamental fish with reference to live bearer species. (T + P) (2 hours)
Day 9	Breeding of Guppies and Mollies. (T + P) (2 hours)
Day 10	Introduction hatchery management system for live bearers. (T + P) (2 hours)
Day 11	Breeding of ornamental fish with reference to selected egg layer species. (T + P) (2 hours)
Day 12	Introduction to Breeding of Angel fish and Zebra fish. (T + P) (2 hours)
Day 13	Introduction hatchery management system for egg layers. (T) (2 hours)
Day 14	Ornamental Fish-diseases and their management. (2 hours)
Day 15	Health management in Ornamental Fish Farming.Overall discussion. Doubts clear and revision (2 hours)

Detail Work Schedule

Date	Day	Contents	Time	Duration	Experts	Designation
01.11.19	1	Basics of aquaculture and scope. History of aquaculture: Present global and national scenario.	12 to 2pm	2	Dr.Subhamoy Das	HOD, Zoology, MRC
02.11.19	2	Ornamental fisheries-e new dimensions in aquaculture entrepreneurship. (T + P)	1 to 3 pm	2	Dr.Subhamoy Das	HOD, Zoology, MRC
04.11.19	3	Introduction to aquarium and aquarium accessories. Basic knowledge on profile of ornamental fishes in world. (T + P)	3 to 5pm	2	Dr.Subhamoy Das	HOD, Zoology, MRC
05.11.19	4	Identify, classify and describe an aquarium fishes (T + P)	03 to 05pm	2	Prof.Manik Das	SACT Mahishadal Raj College
06.11.19	5	Brood fish collection and rearing. (T + P)	02 to 04pm	2	Prof.Manik Das	SACT Mahishadal Raj College
07.11.19	6	Introduction to Aquarium plants and their export potential. (T + P)	01 to 03pm	2	Prof. Moumita Jana	SACT Mahishadal Raj College
08.11.19	7	Management of ornamental aquatic plants and its trading (T + P)	03 to 05pm	2	Prof. Moumita Jana	SACT Mahishadal Raj College
09.11.19	8	Breeding of ornamental fish with reference to live bearer species. (T + P)	02 to 04pm	2	Prof. Saheli Maiti	SACT Mahishadal Raj College
11.11.19	9	Breeding of Guppies and Mollies. (T + P)	02 to 04pm	2	Prof. Saheli Maiti	SACT Mahishadal Raj College
12.11.19	10	Introduction hatchery management system for	01 to 03pm	2	Prof. Saheli Maiti	SACT Mahishadal

		live bearers. (T + P)				Raj College
13.11.19	11	Breeding of ornamental fish with reference to selected egg layer species. (T + P)	02 to 04pm	2	Prof. Sagnik Mandal	SACT Mahishadal Raj College
14.11.19	12	Introduction to Breeding of Angel fish and Zebra fish. (T + P)	01 to 03pm	2	Prof. Sagnik Mandal	SACT Mahishadal Raj College
16.11.19	13	Introduction hatchery management system for egg layers. (T+P)	01 to 03pm	2	Prof. Sagnik Mandal	SACT Mahishadal Raj College
18.11.19	14	Ornamental Fish-diseases and their management.	01 to 03pm	2	Prof. Sagnik Mandal	HOD, Zoology, MRC,
19.09.19	15	Health management in Ornamental Fish Farming. Overall discussion. Doubts clear and revision	12 to 2 pm	2	Dr. Subhamoy Day, Dr. Rajkumar Guchhait, Prof. Sagnik Manadal, Prof. Manik Das and Prof. Moumita Jana. DR.Asim Kr Bera	HOD & SACT., Zoology; Principal, MRC
				30 hours		

- **Course structure and examination scheme:**

Course name	Theory classes (hr.)	Practical classes (hr.)	Theory marks	Practical marks	Total marks
Ornamental-Fish Breeding	15	15	40	10	50

- **Participant's Details and attendance:**
  - **Enrolment Details of Students**

Sl. No.	Class	Roll No.	Name	Signature
1.	B. Sc. General	2180404	RITTWIK CHAKRABORTY	
2.	B. Sc. Generic	21800142	INDRANI SEN	
3.	B. Sc.,(HONS)	2170610	TAMALIKA DAS	
4.	B. Sc. (HONS)	2170025	MAMPA DAS	
5.	B. Sc.,(HONS)	2170032	SANGITA ADHIKARY	
6.	B. Sc.,(HONS)	2170278	AMIT PRAMANIK	
7.	B. Sc. General	2180447	NAIMA AKTAR	
8.	B. Sc. Generic	2180198	SOUMYATTAM BERA	
9.	B. Sc.,(HONS)	2170280	SK . MUSTANGIR	
10.	B. Sc.,(HONS)	2170285	SUDIP DAS	
11.	B. Sc.,(HONS)	2170287	BITHI BERA	
12.	B. Sc.,(HONS)	2170289	SRABANTI MISTRI	
13.	B. Sc.,(HONS)	2170298	NAMITA BERA	
14.	B. Sc. General	2180458	SOUMYADIP PANDA	
15.	B. Sc. Generic	2180531	SUTALIKA MAITY	
16.	B. Sc.,(HONS)	2170300	RAHUL ROY	
17.	B. Sc. General	2180474	PAPIYA MAITY	
18.	B. Sc. Generic	2180333	SHUVASIS KUNDU	
19.	B. Sc.,(HONS)	2170302	TINA JANA	
20.	B. Sc.,(HONS)	2170303	MOUSUMI GHORAI	
21.	B. Sc. General	2180475	JAYASHREE BHOWMIK	
22.	B. Sc. Generic	2180543	PARAMITA MAJI	

23.	B. Sc.,(HONS)	2170304	ARNAB DAS	
24.	B. Sc.,(HONS)	2170307	RESHMA KHAN	
25.	B. Sc.,(HONS)	2170311	PABITRA PATRA	
26.	B. Sc.,(HONS)	2170312	SHRABANTI PRAMANIK	
27.	B. Sc.,(HONS)	2170322	SUPRIYA GIRI	
28.	B. Sc.,(HONS)	2170342	SUVENDU DAS	
29.	B. Sc.,(HONS)	2170347	RESHMA KHATUN	
30.	B. Sc.,(HONS)	2170348	TRISHA MANDAL	

Organized by Department Zoology

Topic: - Ornamental-Fish Breeding

Attendance Record (Day1-Day 8)

Add on course- 2019-2020

Sl. No.	Name of Students	01.11.19	02.11.19	04.11.19	05.11.19	06.11.19	07.11.19	08.11.19
1.	MONOJ SHEE							
2.	SUCHANDA MAITY							
3.	TAMALIKA DAS							
4.	MAMPA DAS							
5.	SANGITA ADHIKARY							
6.	AMIT PRAMANIK							
7.	NAIMA AKTAR							
8.	SOUMYATTAM BERA							
9.	SK . MUSTANGIR							
10.	SUDIP DAS							
11.	BITHI BERA							
12.	SRABANTI MISTRI							
13.	NAMITA BERA							
14.	SOUMYADIP PANDA							
15.	SUTALIKA MAITY							
16.	RAHUL ROY							
17.	PAPIYA MAITY							
18.	SHUVASIS KUNDU							
19.	TINA JANA							
20.	MOUSUMI GHORAI							
21.	JAYASHREE BHOWMIK							
22.	PARAMITA MAJI							
23.	ARNAB DAS							
24.	RESHMA KHAN							
25.	PABITRA PATRA							
26.	SHRABANTI PRAMANIK							
27.	SUPRIYA GIRI							
28.	SUVENDU DAS							
29.	RESHMA KHATUN							
30.	TRISHA MANDAL							

Attendance Record (Day9-Day 15)

Sl. No.	Name of Students	09.11.19	11.11.19	12.11.19	13.11.19	14.11.19	16.11.19	18.11.19
1.	MONOJ SHEE							
2.	SUCHANDA MAITY							
3.	TAMALIKA DAS							
4.	MAMPA DAS							
5.	SANGITA ADHIKARY							
6.	AMIT PRAMANIK							
7.	NAIMA AKTAR							
8.	SOUMYATTAM BERA							
9.	SK . MUSTANGIR							
10.	SUDIP DAS							
11.	BITHI BERA							
12.	SRABANTI MISTRI							
13.	NAMITA BERA							
14.	SOUMYADIP PANDA							
15.	SUTALIKA MAITY							
16.	RAHUL ROY							
17.	PAPIYA MAITY							
18.	SHUVASIS KUNDU							
19.	TINA JANA							
20.	MOUSUMI GHORAI							
21.	JAYASHREE BHOWMIK							
22.	PARAMITA MAJI							
23.	ARNAB DAS							
24.	RESHMA KHAN							

25.	PABITRA PATRA							
26.	SHRABANTI PRAMANIK							
27.	SUPRIYA GIRI							
28.	SUVENDU DAS							
29.	RESHMA KHATUN							
30.	TRISHA MANDAL							

Books and References Recommended

- Hawlins, A.D. (Ed). Aquarium Systems. Academic Press.
- Hunnam, P. Ward Lock, Living Aquarium.
- Ratjak, K. and Zukal, R., Aquarium Fishes and Plants.
- Dick Mills, 1987. Illustrated Guide to Aquarium Fishes. Published by Galley and Price, an imprint of W.H. Smith and Sons Limited, England.
- Dick Mills and Gwynne Vevere. Tropical Aquarium Fishes. Published by Salamander Books Limited. London.
- Carcacson, R.H. A field guide to the Coral Reef Fishes of the Indian and West Pacific Oceans.
- Guy N. Smith. Profitable Fish Keeping.
- Maurice Melzak. Marine Aquarium Manual. B.T. Balsford Ltd., London.
- Ornamental aquarium fishes of India- 1999- K.L.Tekrival and A.A. Rao.- TFH United Kingdom.

Sample Question of Examination

Multiple choice questions **2 x 20 = 40**

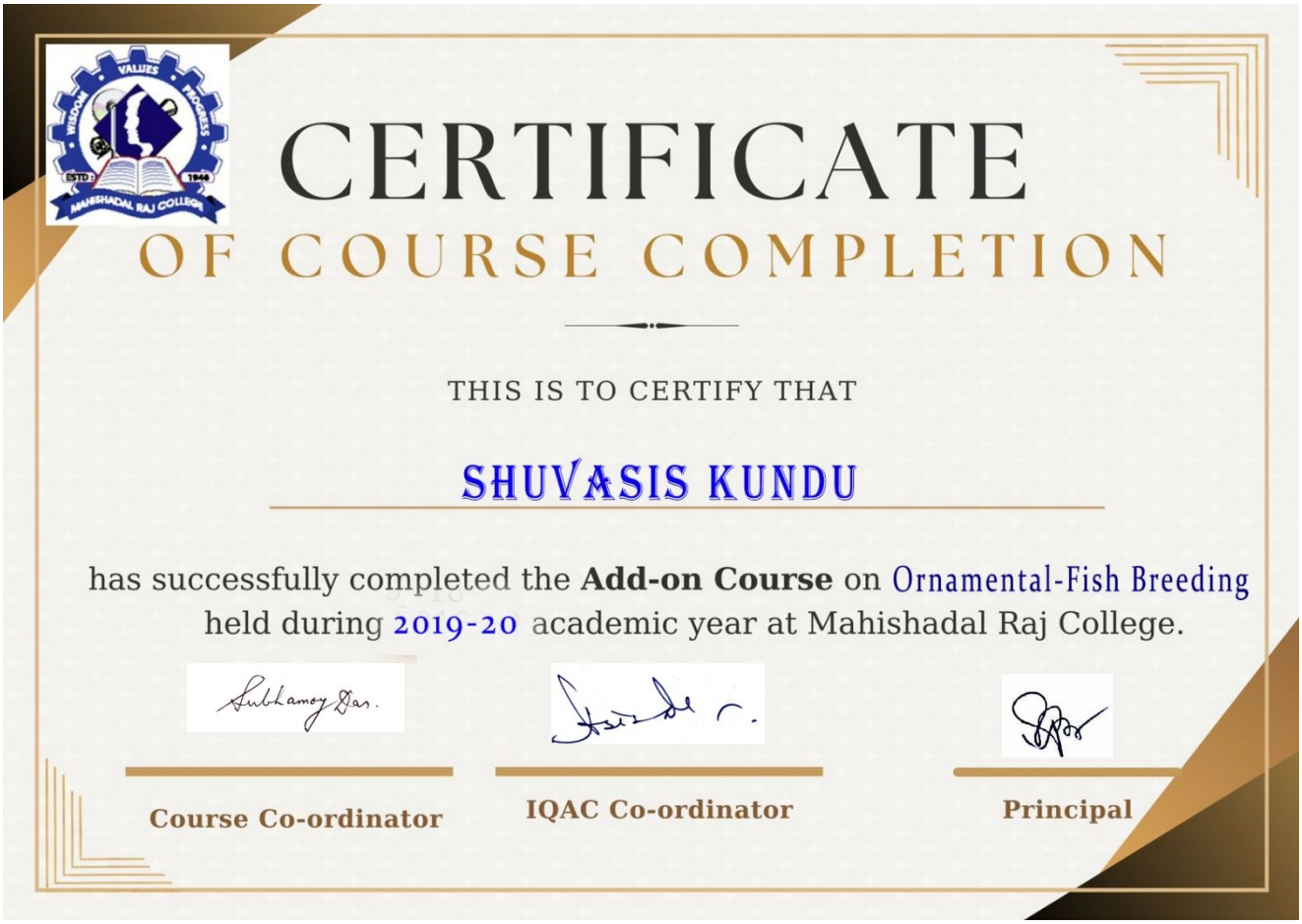
1. Which one of the following ornamental fishes is exotic?
a) Zebrafish
b) Glassfish
c) Honey Gourami
d) Sail Fin Molly
2. Floating plants are required for breeding
a) Guppies Yes
b) Angel fish
c) Swordtail
d) Gourami
3. Which one of the following ornamental fishes is an egg-layer?
a) Neon Tetra
b) Marble Molly
c) laty
d) Swordtail
4. Ammonia concentration is toxic to fish beyond
a) 0.5 mg/lit
b) 0.75 mg/lit
c) 10 mg/lit
d) 0.05 mg/lit
5. Which one of the following fishes is reared in heated aquarium?
a) Gold Fish
b) Black Skirt Tetra
c) Kissing Gourami
d) Neon Tetra
6. Aquarium water should be aerated during
a) Early morning Yes
b) Noon
c) Evening
d) Night
7. The glass-plates of a home aquarium is sealed by –
a) Agar Glue
b) Polusulfide sealant
c) Silicon Rubber Sealant
d) Flour Glue
8. What is the common name of Poeciliasphenops?
a) Short-finned Molly
b) Sail-fin Molly
c) Mexican Sail-fin Molly

d) Gold Molly

9. The Gestation period of molly
a) 24 days
b) 12 days
c) 28 days
d) 60 days
10. The sex ratio for gold fish breeding (Male: Female)
a) 2:1
b) 1:2
c) 1:3
d) 1:1
11. The best live food for gold fish brooders
a) Moina
b) Earthworm
c) Algae
d) Larvae
12. Breeding traps are generally used for
a) Livebearers
b) Anabantids
c) Danio
d) Goldfish
13. The ornamental fish which is banned in India is
a) Discus
b) Oscar
c) Piranah
d) Peacock cichlid
14. ---------- being first among ornamental fish producing country
a) Singapore
b) India
c) Malaysia
d) Japan
15. The coloration in the ornamental fish can be enhanced using
a) MS 222
b) Probiotics
c) 17 & MT
d) Carotenoids
16. The appearance of tubercle is the identification character of male
a) Gold fish
b) Oscar
c) Discus
d) None
17. In Intensive Aquariculture the design of the tank should be
a) Circular

b) Square
c) Rectangular
d) Cylindrical
18. Which of the following is having highest ornamental fish export value in India
a) Mumbai
b) Kolkata
c) Chennai
d) Coimbatore
19. Which state in India has highest ornamental fish production
a) West Bengal
b) Tamil Nadu
c) Maharashtra
d) Manipur
20. Feeding habit of Gold fish is
a) Herbivore
b) Carnivore
c) Omnivore Yes
d) None

- ***SAMPLE CERTIFICATE OF COURSE COMPLETION***



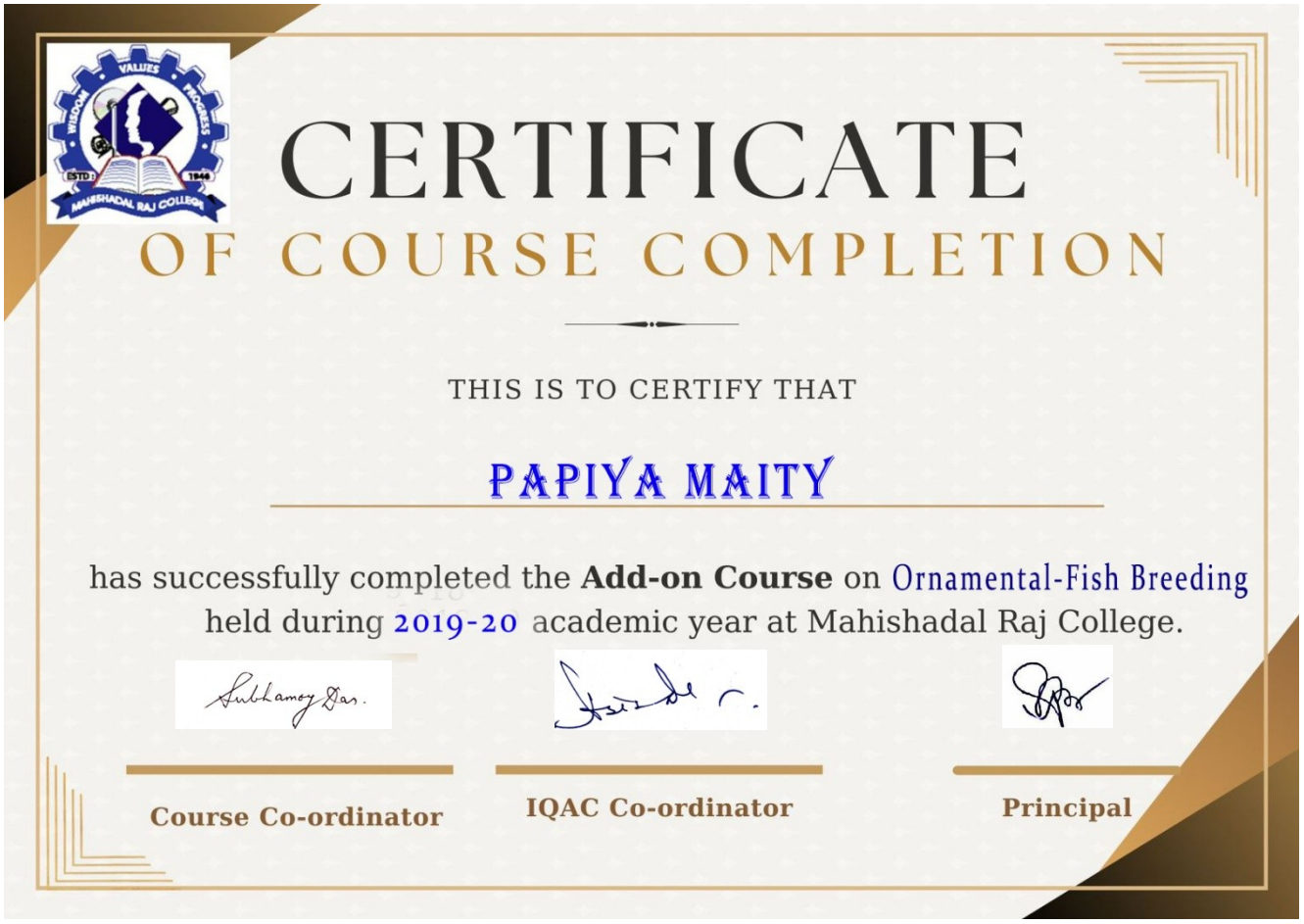
CERTIFICATE
OF COURSE COMPLETION

THIS IS TO CERTIFY THAT

SHUVASIS KUNDU

has successfully completed the **Add-on Course** on Ornamental-Fish Breeding held during 2019-20 academic year at Mahishadal Raj College.

Course Co-ordinator | IQAC Co-ordinator | Principal



CERTIFICATE
OF COURSE COMPLETION

THIS IS TO CERTIFY THAT

PAPIYA MAITY

has successfully completed the **Add-on Course** on Ornamental-Fish Breeding held during 2019-20 academic year at Mahishadal Raj College.

Course Co-ordinator | IQAC Co-ordinator | Principal