

**DEPARTMENT OF AQUACULTURE**  
**M E S ASMABI COLLEGE, P. VEMBALLUR**  
**CERTIFICATE COURSE: 2018-19**

Course Title: **Fish Hatchery Management**

Course Code: **CCAQFHM**

Course Duration: **45 Hrs**

Course Objectives:

To learn seed production and hatchery management of commercially important cultivable fishes.

Course Outcomes:

CO1: Study the biology and reproduction of economically important fishes.

CO2: Breed commercially important finfish and can setup the student's own hatchery.

CO3: Serve as advisory to entrepreneurs in fish seed production.

**Course Syllabus**

**Theory: 25 Hrs**

Module 1:

Freshwater and marine fish seed resources. Natural breeding of finfishes. Selection of riverine spawn collection sites, gears used and methods of collection. Spawn quality and quantity indices. Advantages and disadvantages of riverine seed collection. Sexual maturity and breeding season of various cultivable species. Development of gametes in male and female. Fish egg and embryonic development. **(3Hrs.)**

Module 2:

Induced breeding of warm water finfishes, environmental factors affecting spawning, sympathetic breeding. Hypophysation of fishes. Fish pituitary gland – its structure, collection, preservation and preparation of extract for injection, dosages and methods of injection. Brood-stock management and transportation of brood fish. Synthetic hormones used for induced breeding of carps. **(10 Hrs.)**

Module 3:

Different types of fish hatcheries-traditional, Chinese, glass jar and modern controlled hatcheries. Causes of mortalities of eggs and spawn and remedies. Spawn rearing techniques. Use of anesthetics in fish breeding and transport. Breeding techniques for Indian major carps, exotic carps, tilapias, catfishes, grey-mullets, milk fish, pearl spot, sea bass, groupers, pacu, cobia, pompanos and indigenous fishes, etc. **(8 Hrs.)**

#### Module 4:

Off-season and multiple breeding of carps. Reproductive Biology of IMC, Development, maturation and maintenance of gonads, anatomy of gonads, developmental stages, endocrine control of reproduction, cryopreservation of fish gametes. **(4 Hrs.)**

#### **Practicals: 20 Hrs.**

Study of maturity stages in fishes. Calculation of fecundity. Brood-stock maintenance and selection of breeders for injection. Induced breeding by any commercial synthetic inducing agent – brooder selection, dosage calculation, injection, egg estimation, hatching and fry rearing.

Study of fish eggs and embryonic developmental stages. Identification of eggs, spawn, fry and fingerlings of different species. Preparation and management of fish nursery. Fish seed and brood-stock transportation, use of anesthetics, disinfectants and antibiotics in fish breeding. Water quality monitoring in fish hatcheries and nurseries.

#### **Suggested Books:**

1. Breeding and Seed Production of Finfish and Shellfish- P.C. Thomas
2. Aquaculture: Principles and Practices - T.V.R.Pillay
3. Freshwater Aquaculture - R.K.Rath
4. Handbook of Fisheries and Aquaculture - ICAR publication

### **Course Plan and Schedule:**

#### **Session 1**

Freshwater and marine fish seed resources. Natural breeding of fin fishes. Selection of riverine spawn collection sites, gears used and methods of collection. Fish seed resources 1. Fish spawn collection lecture 1

#### **Session 2**

Spawn quality and quantity indices. Advantages and disadvantages of riverine seed collection. Sexual maturity and breeding season of various cultivable species. Sexual maturity lecture 2. Sexual Maturity in fishes .

#### **Session 3**

Practical

Study of maturity stages in fishes. Collection and preservation of fish pituitary gland. Maturity Stages in fishes.

#### **Session 4**

Development of gametes in male and female. Fish egg and embryonic development. Egg development. Egg and embryonic development session 3

#### **Session 5**

Methods of injection, dosage calculation, egg counting etc.

#### **Session 6**

Practical - Sexing, Brooder selection and care.

#### **Session 7**

Collection and hatching of eggs, factors involved in bundh breeding, advantages and disadvantages of bundh breeding. Bundh breeding salia reservoir

#### **Session 8**

Induced breeding of warmwater finfishes, environmental factors affecting spawning, sympathetic breeding. Induced breeding of warm water fish

#### **Session 9**

Practical - Brood-stock maintenance and selection of breeders for injection and Histological studies of ovary and testes. Broodstock management

#### **Session 10**

Hypophysation of fishes. Fish pituitary gland – its structure, collection, preservation and preparation of extract for injection, dosages and methods of injection. Fish Pituitary gland Collection.

#### **Session 11**

Brood-stock management and transportation of brood fish. Fish brood stock management.

#### **Session 12**

Practical - Different fish hatchery systems, study of fish eggs and embryonic developmental stages. Chinese Circular Hatchery

#### **Session 13**

Synthetic hormones used for induced breeding of carps. Synthetic hormones.

#### **Session 14**

Production of synthetic hormones.

#### **Session 15**

Practical - Different fish hatchery systems, study of fish eggs and embryonic developmental stages.

#### **Session 16**

Causes of mortalities of eggs and spawn and remedies. Causes of mortality of fish egg and treatmentdocx Fish egg Mortalities

#### **Session 17**

Spawn rearing techniques. Spawn conditioning and rearing.

#### **Session 18**

Practical - Identification of eggs, spawn, fry and fingerlings of different species and Preparation and management of fish nursery. Nursery Pond Preparation

#### **Session 19**

Use of anesthetics in fish breeding and transport. Transportation of fish spawn Anesthetics in Aquaculture

#### **Session 20**

Breeding techniques for Indian major carps and exotic carps. Induced Breeding in Carps  
Induced breeding of Indian major carps

#### **Session 21**

Practical - Disinfectants and antibiotics in fish breeding and Water quality monitoring in fish hatcheries and nurseries. Water quality parameters in aquaculture

#### **Session 22**

Breeding of cold water species of fishes.

#### **Session 23**

Breeding techniques of tilapias and catfishes, Breeding of tilapia and cat fish Breeding of Tilapia

#### **Session 24**

Practical - Breeding and larval rearing of common finfishes- *Pangasius pangasius* breeding

#### **Session 25**

Breeding techniques of grey-mullets, milk fish, pearl spot, and sea bass.

#### **Session 26**

Breeding techniques of groupers, pacu, cobia, pompanos and indigenous fishes. Off-season and multiple breeding of carps. Grouper breeding. Groupers and multiple spawning

#### **Session 27**

Practical - Breeding and larval rearing of common finfishes-Tilapia. Tilapia breeding

**Session 28**

Reproductive Biology of IMC, Development, maturation and maintenance of gonads, anatomy of gonads, developmental stages, endocrine control of reproduction, Reproductive Biology in fishes. Reproductive biology of carps.

**Session 29**

Cryopreservation of fish gametes. Case Studies.

**Session: 30:**

Review of theory. Final test.

**ASSESSMENT PROCEDURE**

Total Marks: 100 (Test: max. 80 Marks, Attendance: 20 Marks)

The assessment involves written tests accommodating MCQ and short answer questions. Attendance in classes will be given due weightage. A minimum of 50% of marks in written tests is required for a pass. Minimum of attendance fixed is 75%.

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