

**SWAMI RAMANAND TEERH MARATWADA UNIVERSTIY
NANDED**

Faculty of Science

Choice Based Credit System (CBCS)

SYLLABUS

**B. Sc. Third Year
(Semester- V & VI)**

Subject: Fishery Science

Effective from June 2018

SWAMI RAMANAND TEERH MARATWADA UNIVERSITY, NANDED
Choice Based Credit System (CBCS) Course Structure

Faculty of Science

B. Sc Third Year (Semester- V & VI)

Subject: Fishery Science

Effective from June 2018

Semester/ Annual	CourseNo	Title and number of Paper	Instruction Hrs/ week	Total period	CA	ESE	Total Marks	Credits
Semester V	DSEFS I (Section A)	XII -Indian Fisheries and Mericulture (A)	03	45	10	40	50	2
	DSEFS I (Section B I) OR (Section B II)	XIII -Elective Aquaculture Techniques and Fish nutrition (B I) OR Soil and water management in aquaculture (B II)	03	45	10	40	50	2
Semester V	SECFS –III	Fish feed production Technology (A) + practical OR Culture of fish food Organisms (B)+pract.	3	45	25	25	50	2
Semester VI	DSEFS II (Section A)	XIV Aquarium keeping and rearing of ornamental fishes(A)	03	45	10	40	50	2
	DSEFSII (Section B I) OR (Section B II)	XV -Elective Fish Economics,marketing, Co- operatives & Extension (BI) OR Nutrition and feed Technology (B II)	03	45	10	40	50	2
Semester VI	SECFS IV A OR B	Fabrication of Aquarium (A)+Practical OR Breeding Techniques of Ornamental fishes (B) +pract	3	45	25	25	50	2
Annual	DSEFSPR.	XVI(A) -Practical based on Theory PapersXII+XIV	03	20	05	20	50	2
		XVII(B I) Practical based on Theory Papers OR XVII(B II) Practical based on Theory Papers	03	22	05	20	50	2

**DSEFS Discipline Specific Elective Fishery Science, DSEFSPR- Discipline Specific Elective Fishery Science
Practical, ESE- End Of Semester Examination, CA- Continuous Assessments.**

**SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
SYLLABUS(W E F JUNE – 2018)**

B. Sc Third Year Vth Semester

Subject: - Fishery Science

Theory Paper - XII Indian Fisheries and Mericulture (A) Marks 50

Unit - I

Study of marine fisheries (classification, external feature, distribution, food & feeding, reproduction)

- 1) Sardine fishery.
- 2) Bombay duck fishery.
- 3) Mackerel fishery.
- 4) Sole fishery

Unit – II

- 1) Hilsa fishery.
- 2) Pomfret fishery.
- 3) Mollusk fishery, (Cephalopod, Chunks).
- 4) Prawn fishery.

Unit – III

Mericulture:-

- 1) Prawn Culture.
- 2) Mussel Culture (Edible oyster)
- 3) Pearl oyster culture.
- 4) Seaweed culture.

Unit - IV

Important lakes and Estuarine fisheries of India

- 1) Hooghly-Matla estuary
- 2) Chilka lake
- 3) Pulicat lake
- 4) Kolleru lake .

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

SYLLABUS (WEF JUNE – 2018)

B. Sc Third Year V Semester

Subject: - Fishery Science

Theory Paper – XIII

Aquaculture Technique and Fish nutrition (Elective B I)

Marks: 50

Unit – I

Fish culture:

1. Culture of Indian major carps.
2. Culture of airbreathing fishes.
3. Culture of milk fish – Chanos chanos.
4. Culture of sea bass.
5. Culture of crabs.

Unit - II

Marine water prawn culture:

1. Study of general characteristics.
2. Food and feeding.
3. Selection of site.
4. Collection of broods.
5. Mating and spawning.
6. Development.
7. Water quality for culture.
8. Prawn rearing.
9. Larval food supply.
10. Methods of fishing.

Unit- III

Fish Nutrition:

- 1) Ingredients for fish feed.
 - i) Mill - by – Products.
 - ii) Oil extractives.
 - iii) Animal by- products.

iv) Miscellaneous.

2) Fish feed formulation.

i) Balancing crude protein level.

ii) Steps in feed formulation.

iii) Best-bye techniques.

iv) Storage and distribution.

Unit- IV

Aquaculture and Probiotics

1) Introduction and Definition.

2) History of probiotics.

3) Selection criteria for probiotics

4) Composition and dosages.

5) Potential of probiotics

i) Pathogen inhibition

ii) Growth promoters

iii) Water quality maintenance

6) Overall significance of probiotics in aquaculture.

SWAMI RAMANAND TEERH MARATWADA UNIVERSTIY, NANDED
B.Sc. Third Year (CBCS Pattern)
Syllabus (W E F June 2018)
Semester- V
Subject: - Fishery Science
Theory Paper XIII

Soil And Water Quality Management In Aquaculture (Elective B II)

Marks-50

UNIT I

Soil and water interaction:

- 1) Physical properties of water
- 2) Chemical properties of water
- 3) Physical properties of soil
- 4) Chemical properties of soil
- 5) Aquatic microorganisms and their role in carbon, nitrogen, phosphorus and sulphur cycles and impact on aquatic habitats and species.

UNIT II

Soil and water quality monitoring:

- 1) soil and water quality standards.
- 2) soil and water quality monitoring and management.
- 3) Productivity and eutrophication of water resources

UNIT III

Fertilizers and manures:

- 1) Different kinds of fertilizers, biofertilizers, manures and their applications.
- 2) Use of treated sewage for pond fertilization,

- 3) Ecological changes taking place after fertilizing.
- 4) Utilization of bioactive compounds by microorganisms.

UNIT IV

Soil and water quality management:

- 1) Waste water treatment, water filtration devices, aeration, chlorination, Ozonization and UV radiation.
- 2) Aquatic weed management.
- 3) Water quality management in hatcheries,
- 4) Productivity and eutrophication of water resources

Suggested Readings :

Adhikari S & Chatterjee DK.(2008)-. Management of Tropical Freshwater Ponds. Daya Publ.

APHA, AWWA, WPCF. (1998)- Standard Methods for the Examination of Water and Wastewater, 20th Ed. American Public Health Association, American Water Works Association, and Water Pollution Control Federation, Washington, D. C.

Boyd, C. E. and Tucker, C. S. (1992).- Water Quality and Pond Soil Analyses for Aquaculture, Alabama Agricultural Experimental Station, Auburn University.

Boyd CE.(1979)-. Water Quality in Warm Water Fish Ponds. Auburn University.
Handbook of Fisheries and Aquaculture. ICAR.

SWAMI RAMANAND TEERH MARATWADA UNIVERSTIY, NANDED
B.Sc. Third Year (CBCS Pattern)
Syllabus (WEF June 2018)
Semester- V
Subject: - Fishery Science
SECFS III (A)
Fish Feed Production Technology

1. Introduction
2. Importance of feed
3. Factors affecting feed design, production and feeding
4. Nutritional requirement of fishes
5. Formulated fish feed
 - a. Ingredients for fish feed (Animal origin & plant origin)
 - b. Feed Additives (Binders, antioxidants, antimicrobial agents, chemo attractants, feeding stimulants, Pigments, anabolic agents, miscellaneous)
 - c. Fish Feed Formulation
 - d. Feed types (Wet feed, Moist, Dry, Larval)
 - e. Selection of ingredients
 - f. Formulation of feed
 - g. Feed processing (Premix processing, grinding, mixing, pelleting, extrusion cooking, cooling, drying, crumbling, fat spraying, bagging, storage, quality control)
 - h. Storage
 - i. Quality control

SWAMI RAMANAND TEERH MARATWADA UNIVERSTIY, NANDED
B.Sc. Third Year (CBCS Pattern)
Syllabus from June 2018
Semester- V
Subject: - Fishery Science
SECFS III (B)
Culture of Fish Food Organisms

- a. Introduction:
- b. Micro algae Culture
- c. Infusoria Culture
- d. Rotifer Culture
- e. Artemia nauplii Culture
- f. Moina-Cladocerans Culture
- g. Tubifex worms Culture
- h. Chironomids Culture**

II. REFERENCES

1. V. G. Jhingran, (1991). Fish and fisheries of India. Edition-3, Hindustan Pub. Corp. (India), 727.
2. S. Ayyappan, J. K. Jena, A. Gopalakrishnan, Dr. A. K. Pandey, (2011). Handbook of Fisheries and Aquaculture, Indian Council of Agricultural Research, New Delhi, 755.
3. FAO Technical Paper No.361. Manual on production and use of live food in aquaculture.
4. Pronob Das, Sagar C. Mandal, S. K. Bhagabati, M. S. Akhtar and S. K. Singh (2012). Important Live Food Organisms And Their Role In Aquaculture, Frontiers in Aquaculture, 2012: 69–86.
5. Handbook of Aquafarming: Aquaculture Feed, MPEDA.

**SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
SYLLABUS (WEF JUNE – 2018)**

B. Sc Third year VI Semester

Subject: - Fishery Science

Theory Paper – XIV

Aquarium Keeping and Rearing Of Ornamental Fishes(A)

Total period 45

Marks 50

Unit – I

Fish Aquarium

- 1) Introduction
- 2) Types of aquarium.
- 3) Importance of aquarium.
- 4) Accessories of aquarium.
- 5) Aquarium fabrication.
- 6) Setting of aquarium.

Unit – II

- 1) Care and maintenance of aquarium.
- 2) Aquarium water quality and management.
- 3) Aquarium plants.
- 4) Food for Aquarium fishes.

Unit – III

1. Study of ornamental fishes

(Taxonomy general characters, food and feeding and breeding habits)

A. Egg Layers i) Gold fish ii) Zebra iii) Koi carp vi) Angle v) Gourami

B. Live Bearers i) Guppy ii) Mollies iii) Sword tail iv) Platies

2. Breeding and rearing of ornamental fishes:

- i) Identification of brooders
- ii) Breeding behaviour
- iii) Induced breeding
- iv) Management of water quality In breeding and rearing of fishes.
- v) Transportation of ornamental fishes.

Unit IV

Disease management of ornamental fishes

(Symptoms, life cycle, and control measures)

- i. protozon disease
- ii. Bacterial disease
- iii. Crustecian disease
- iv. Fungal disease
- v. Helminth disesase

**SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
SYLLABUS (WEF JUNE – 2018)**

B. Sc Third year VI Semester

Subject: - Fishery Science

Theory Paper – XV

**Fish Economics, Marketing, Cooperative and Extension
(Elective B I)**

Period 45

Mark 50

Unit – I

Fish economics:

- i) Definitions and principals of fisheries economics.
- ii) Terms in economics.
- iii) Demand.
- iv) Supply.
- v) Cost.

Unit – II

Fish Marketing:

- i) Introduction and definition.
- ii) Characteristics of fish marketing.
- iii) Types of marketing :
 - a) Traditional fish market.
 - b) Modern fish market.
- iv) Types of distribution channel:
 - a) Direct distribution channel.
 - b) Indirect distribution channel.
- v) Marketing functions:
 - a) Functions of exchange.
 - b) Functions of physical supply.
 - c) Facilitating functions.
- vi) Price structure and problems in fish marketing.

Unit – III

Fish Co-operatives:

- i) Definitions and principals of co-operative societies.
- ii) History of co-operatives movements in India.
- iii) Organs of co-operatives
 - i) President ii) vice-presidents iii) Directors iv) Members
 - v) Treasurer vi) Auditors vii) Types of meetings
- iv) Structure of fisheries co-operative society.
 - i) Primary co-operative ii) Regional federation
 - iii) State level federation iv) National federation
 - v) Function of fishermen co-operative society
 - vi) Problems of fishermen co-operative society and their remedial measures.

Unit – IV

Fisheries Eextension:

- i) Governments policies
- ii) Plans and programmes
- iii) Funding, Training and mass media
- iv) Socioeconomics condition of fishermen
- v) Role of FFDA
- vi) Role of remote sensing
 - i) Direct methods
 - ii) indirect methods
- vii) Exclusive economic zone (EEZ)
- viii) Fisheries institutions of India
 - i) Central marine fisheries Research institute – CMFRI
 - ii) Central institute of fisheries Technology – CIFT
 - iii) Central institute of fisheries Education – CIFE
 - iv) Central institute of freshwater Aquaculture – CIFA
 - v) Fisheries survey of India - FSI
 - vi) National institute for oceanography - NIO

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

SYLLABUS EFFECTIVE FROM JUNE – 2018

B. Sc V & VI Semester Subject :- Fishery Science

List of Reference Book

Theory Paper :-XII, XIII, XIV & XV

- =====
- Marine fisheries : Dr. Bal & K. Virbhadrarao.
- Fishery science and Indian fisheries : C.B.L. Shrivastav.
- The Economic of Fisheries management : Anderson L 1977 & John Hapkins.
- Fish economic : P.S. Rao
- Fishery economic and Introduction : Cuningan Dunn whit Masesh, Marshall st. Martins.
- Marketing management : Kothar P 1988 prentice Halt.
- Extension Education : Adivia Reddy & Bapatlal.
- Aquaculture Extension: Gibbons M.J. & R. Shrider 1983
- peace cons. Information collection Exchange manual M 18.
- A Text book of aquaculture : M.Srinivasulu Reddy, K.R.S. Sambasiva Rao.)
- A Text book of Fish Fisheries and Technology : K.P.Biswas
- Hand Book of fish aquarium : Dr.C.J.Hiware,Dr.(Mrs.) S.R.Sonawane.
- Aquaculture and aquarium keeping: S.P.Chavan,M.S.Kadam,S.D.Niture. .
- Fish Feed Technology : ADCP/REP/80/11 FAO (1980)
- The Nutrition And Feeding Of Farmed Fish And Shrimp : A Training Manual Feeding Methods. FAO (1980)
- Nutrition and Feeding of Fish: Kluwere Academic Publication -Tom Lovell (1998)
- Fish Genetics: Sangita Malvee(2008) : SBS, Publishers & Distributors
- Applied fish genetics : Fishing Chimes, Bhaja Krishna Padhi, Radha Kanta Mandal.
- Probiotics and Health Claims : Wolfgang Kneifel, Seppo Salminen (2010)
- The Use of Probiotics in Fish Hatcheries: Results and Prospect : F.J. Gatesoupe (1991)
- Direct-Fed Microbials and Prebiotics for Animals: Todd R. Callaway, Steven C. Ricke (2011)
- Probiotics Applications and Practical Aspects : Fuller , R.(1997)
- Economics for Fisheries Management : Quentin Grafton, R.(2006)
- Fisheries economics : Volume 1, Part 1United States. National Technical Information Service:
Robena J Brown, (1980)
- Fisheries economics: an introduction: Stephen Cunningham, Michael R. Dunn, David
Whitmarsh (1985)
- Fisheries and aquaculture : Ravi Shankar Piska.
- Marine fisheries extension : P.N. Ananth.
- Text book of fishery : Surekha M. Gupta.
- Prawns and prawn Fisheries of India : C.V. Kurian and V.O. Sebastian.
- Remote sensing applications in brackish water fisheries : Arbind Sinha and Sham
Beharisharma.
- Identification of prawns / shrimps of India and their culture : A.D. Dholakia.

Textbook of fresh water fish culture : A. N. Kulkarni.
Fresh Water fish culture Vol. 1 : S.K. Sarkar
Aquaculture: Dr. N. Armugam (Saras Publication)
Fresh water Aquaculture : S.H. Ahmad and A.K. Sing.
Industrial fisheries : K.P. Biswas.
Genotoxicity Assessment in fishes: A practical approach : N.S. Nagapure, Ravindra
kumar, Bardeo Kushwahe, Poonam Jayant Singh, Satish K. Shrivastva and W.S. Lakra.
Fresh water fish Diversity of Central India : W.S. Lakara and U.K. Sarkar.
Fish Biodiversity of India : D.Kapoor, R.Dayal and A.G. Porniah.
Biology, Breeding and farming of important food fishes : N.M. Chakrabarti.
Manual of Fresh water Biota : Datta Munghi J.S. Fish and fisheries : pandey and shukla.
Fish Harvesting and processing: R.B. Selvamani and R.K. Mahadevan.
Textbook of fish and fisheries : G.S. Sandhy.
Fish processing and preservation: Charls L. Cutting.
The fishes of India: Francis Day Vol.1 and 2.
Fish and fisheries of India: V.G. Jhingran.
Economics of fisheries: P.N. Panday, B.C. Jha, B.K. Gorai.
Fundamentals of Freshwater Biology: J.D. Munshi and J.S.D. Munshi.

SWAMI RAMANAND TEERH MARATWADA UNIVERSTIY, NANDED

B.Sc. Third Year (CBCS Pattern)

Syllabus (WEF June 2018)

Semester- VI

Subject: - Fishery Science

Theory Paper –XV

Nutrition and Feed Technology (Elective B II)

Period 45

Marks-50

UNIT I

- 1) Fish nutrition: Principles of fish nutrition and terminologies.
- 2) Nutritional requirements of cultivable finfish: larvae, juveniles and adults.
- 3) Nutritional biochemistry: Classification, nutrient quality and evaluation of proteins, lipids and carbohydrates.
- 4) Role of nutrients: amino acids, fatty acids, proteins, lipids, carbohydrates, vitamins and minerals.

UNIT II

- 1) Nutritional physiology:
 - Digestion,
 - Accretions
 - Nutrient flow,
 - Factors affecting digestibility.
- 2) Nutrient deficiency and symptoms

UNIT III

- 1) Feed Resources: Nutritional value of feed ingredients and live feed.
- 2) Importance of natural food to nutrient requirements of fish
- 3) Feed additives -attractants, growth stimulants and probiotics and binders

UNIT IV

- 1) Feed Manufacture: Feed formulation and processing.
- 2) On-farm feed manufacture.
- 3) Commercial feed manufacture.

- 4) Feed storage.
- 5) Supplementary feed.
- 6) Feeding methods and scheduling.
- 7) Feed performance and economics.

Suggested Readings:

ADCP(1980). (Aquaculture Development and Co-ordination Programme).

Fish Feed Technology. ADCP/REP/80/11. FAO.

Cyrino EP & Bureau D & Kapoor BG. (2008). Feeding and Digestive Functions in Fishes. Science Publ.

D' Abramo LR, Conklin DE & Akiyama DM. (1977). Crustacean Nutrition:Advances in Aquaculture. Vol. VI. World Aquaculture Society,Baton Rouge.

De Silva SS & Anderson TA. 1995. Fish Nutrition in Aquaculture. Chapman & Hall Aquaculture Series.

Halver J & Hardy RW.(2002). Fish Nutrition. Academic Press.

Halver JE & Tiews KT. (1979). Finfish Nutrition and Fishfeed Technology Vols. I, II Heenemann, Berlin.

Hertrampf JW & Pascual FP. (2000). Handbook on Ingredients for Aquaculture Feeds.

Kluwer. Houlihan D, Boujard T & Jobling M. (2001). Food Intake in Fish. Blackwell.

Lavens P & Sorgeloos P. (1996). Manual on the Production and Use of Live Food for Aquaculture.

FAO Fisheries Tech. Paper 361,

Lovell RT. (1998). Nutrition and Feeding of Fishes. Chapman & Hall.

Ojha JS. (2005). Aquaculture Nutrition and Biochemistry. Daya Publ.

SWAMI RAMANAND TEERH MARATWADA UNIVERSTIY, NANDED
B.Sc. Third Year (CBCS Pattern)
Syllabus (WEF June 2018)
Semester- VI
Subject: - Fishery Science
SEC IV (Theory)
Fabrication of Aquarium (A)

1. Introduction
2. Types of aquarium
3. Different shape & sizes of aquarium
4. Accessories for aquarium fabrication
5. Fabrication of aquarium
6. Aquarium tank accessories
7. Setting of aquarium

**** Practical based on theory paper**

SWAMI RAMANAND TEERH MARATWADA UNIVERSTIY, NANDED
B.Sc. Third Year (CBCS Pattern)
Syllabus (W E F from June 2018)
Semester- VI
Subject: - Fishery Science
SEC IV (Theory)

Breeding Techniques of Ornamental Fishes (B)

1. Introduction
2. Breeding of egg-scatterers (With adhesive eggs & non-adhesive eggs)
3. Breeding of egg-depositors
4. Breeding of egg-buriers
5. Breeding of nest-builders
6. Breeding of live-bearers

**** Practical based on theory paper**

Reference:

1. P. C. Thomas, Suresh Rath and Kanta Das Mohapatra (2014). Breeding & seed production of fin fishes & Shell fishes, Daya Publishing House (Astral International Pvt. Ltd.), New Delhi, 402p.
2. C. W. EMMENS: Keeping and Breeding Aquarium Fishes
3. Training Manual on Advances in Keeping & Breeding Ornamental Fishes

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
SYLLABUS (WEF JUNE – 2018)
B. Sc III Year Semester V&VI.
Fishery Science.
Practical Paper – XVI
(Based on XII+XIV)

Mark 50

- 1) Identification, classification and commercial importance of following fishes.
 - 1) Sardine 2) Mackerel 3) Bombay duck 4) Sole fish 5) Pomfret 6) Ribbon fish 7) Hilsa 8) Mugil
- 2) Identification, classification and commercial importance of following Non fish organisms
 - 1) Penaeus indicus 2) Penaeus Monodon 3) Edible oyster 4) Pearl oyster 5) Sepia 6) Loligo 7) Chunks. 8) Mytilus
- 3) Study of fishing crafts and gears (Five each)
- 4) Identification penaeid and non penaeid prawns with sex.
- 5) Identify and describe the aquarium accessories with their use and maintains. (any five).
- 6) Preparation of an aquarium tank of suitable size.
- 7) Setting of aquarium.
- 8) Maintenance of an aquarium.
- 9) Study of aquarium fishes (any five).
- 10] Study of aquarium plants (any five).
- 11] Study of fish pathogens

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
SYLLABUS (WEF JUNE – 2018)
B. Sc III Year Semester V&VI
Fishery Science
Practical Paper – XVII (B I)
(Based on XIII+XV)

50 Marks

- 1) Study of cultivable fishes: Labeo ,Catla, Cirrhina, Chanos chanos, Sea bass, Clarius, Anabus, Channa, Heteropneustes fossilis
- 2) Non fish organisms - P. indicus , P.monodon, Crab
- 3) Study of phytoplankton and zooplanktons (Any 5)
- 4) Study of locally available feed ingredients (Any 5)
- 5) Formulation of fish feed
- 6) Estimation of crude protein from feed ingredients and feed.
- 7) Estimation of lipid from feed ingredients and feed.
- 8) Estimation of carbohydrate from feed ingredients and feed.
- 9) Estimation of vitamin from feed ingredients and feed.
- 10) Collection and submission of locally available feed ingredients.
- 11) Submission of prepared fish feed.
- 12) Calculate per hector income of fish production from given data.
- 13) Visit to fisheries co-operative society/ Fish market

SWAMI RAMANAND TEERH MARATWADA UNIVERSTIY, NANDED

B.Sc. Third Year (CBCS Pattern)

Syllabus (WEF June 2018)

Semester- V and VI

Subject: - Fishery Science

Practical Paper- XVII (Elective B II)

Based on XIII(BII)+XIV(BII)

Marks-50

-
1. Study of fish feed ingredients.
 2. Study of equipments used in water and soil analysis.
 3. Study of different types of organic and inorganic fertilizers.
 4. Study of Aquatic weeds.
 5. Study of Planktons
 6. Estimation of dissolved oxygen, carbon dioxide, salinity, temperature and conductivity of water
 7. Estimation of crude protein, Carbohydrate, and lipid from feed ingredients.
 8. Estimation of Nitrogen, Phosphorus, Potassium of soil sample.
 9. Fish feed formulation
 - 10 Submission of feed ingredients and prepared fish feed
 - 11 Submission of different types of fertilizers
 - 10 Submission of Aquatic weeds and Planktons
 - 13 Submission of Tour report and Record book

**SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY
NANDED**

(WEF JUNE – 2018)

B. Sc III Year (V&VI Semester)

Fishery Science

Practical Paper – XVI (A)

Time: 3 hrs

Marks: 50

- =====
- | | |
|--|----|
| 1] Identify, Classify and comments on cultivable fishes. (Any three) | 09 |
| 2] Identify, Classify and comments Non fish organism (Any Two) | 06 |
| 3] Identify & describe fish feed ingredients (Any two) | 06 |
| 4] Estimation of protein /Carbohydrate /Lipid from fish feed (Any one) | 08 |
| 5] Calculate per hector income of fish production from given | 06 |
| 6] Submission of fishing crafts & gears model, prepared fish feed
and feed ingredients. | 05 |

Internal marks

- | | |
|-----------------------------------|----|
| 1] Record book & Excursion Report | 05 |
| 2] Test on practical | 05 |

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
SYLLABUS (WEF JUNE – 2018)

B.Sc III Year
(V&VI Semester)

Fishery Science
Practical Paper – XVII

Time: 3 hrs

Marks : 50

-
- | | |
|--|----|
| 1] Identify ,Classify and Comments on commercially important fishes (Any two) | 06 |
| 2] Identify, classify and Comments on commercially important Non fish organism
(AnyTwo) | 06 |
| 3] Identify and Comments on fishing crafts and gears (One each) | 06 |
| 4] Identify& describe aquarium fishes & aquarium plant.(Two each) | 12 |
| 5] Identification and Prepration of permanat slide of fish pathogen (Any one) | 10 |

Internal Marks

- | | |
|--|----|
| 1] Submission of Record book, viva voce. | 05 |
| 2] One test on practical | 05 |

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
SYLLABUS (WEFJUNE – 2018)
B.Sc III Year (V&VI Semester)
Fishery Science Question Paper Pattern
Paper No XII,XIII,XIV, XV

Marks 40

All questions carry equal marks

Q.1 Write a short notes on any four on the following: (Based on all units) Marks 08

- A)
- B)
- C)
- D)
- E)
- F)

Q.2 Write notes on (any two) of the following (Based on I&II units) Marks 08

- A)
- B)
- C)

Q.3 Long answer question (Based on I&II units) Marks 08
OR

Long answer question

Q.4 Write notes on (any two) (Based on III&IV units) Marks 08

- A)
- B)
- C)

Q.5 Long answer question (Based on III&IV units) Marks 08
OR

Long answer question

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
B. Sc Third Year (WEF JUNE – 2018)
Subject: - Fishery Science
Practical Paper XVII
(Based on elective paper B II)

Time 3 Hours

Marks 50

1. Identify and described as per instructions (Any Three) 09
(Feed ingredients/ Aquatic weeds/ Planktons)
 2. Identify and described as per instructions (Any Three) 09
(Equipments/ Fertilizers)
 3. Estimation of CO₂./DO/, Salinity from given water sample (Any One) 08
- OR
- Estimation of N/P/K from given sample (Any One)
4. Estimation of Crude Protein/ Carbohydrate/ Liquid from feed ingredients. (Any one) 08
 5. Submission of Aquatic weeds, Planktons and Fertilizers. 06

Intrenal Marks

1. Record book and Viva voce 05
2. One test on practical 05

Board of Studies in Fishery Science

- | | |
|--|-----------------|
| 1 Dr. Gaikwad Jayprakash Manikrao
Shri. Shivaji College, Parbhani | Chairman |
| 2 Dr. Ahirrao Sunil Deoram
Shri Shivaji College, Parbhani. | Member |
| 3 Dr. Papatwar N.G.
DSM Arts, Commerce And Science College, Jintur
Dist. Parbhani. | Member |
| 4 Dr. Kadam Sunil Uttamrao.
DSM College, Parbhani.
Dist. Parbhani | Member |
| 5 Mrs. Ratna Vyankat Kirtane.
Dayanand Science College, Latur | Member |
| 6 Dr. Hiwre Chandrashekhar J.,
Professor & Head , Dept of Zoology,
Dr. B.A.M.University, Aurangabad | Member |
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