

॥ सा विद्या या विमुक्तये ॥



स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

“ज्ञानतीर्थ” परिसर, विष्णुपुरी, नांदेड - ४३१६०६ (महाराष्ट्र)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

“Dnyanteerth”, Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)

Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade

ACADEMIC (1-BOARD OF STUDIES) SECTION

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संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील द्वितीय वर्षाचे CBCS Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२०-२१ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, दिनांक २० जून २०२० रोजी संपन्न झालेल्या ४७व्या मा. विद्या परिषद बैठकीतील विषय क्र.११/४७-२०२०च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील द्वितीय वर्षाचे खालील विषयांचे C.B.C.S. (Choice Based Credit System) Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२०-२१ पासून लागू करण्यात येत आहेत.

- | | |
|---|---|
| 1. B.Sc.-II Year-Biophysics | 2. B.Sc.-II Year-Bioinformatics |
| 3. B.Sc.-II Year-Biotechnology | 4. B.Sc.-II Year-Biotechnology (Vocational) |
| 5. B.Sc.-II Year-Food Science | 6. B.Sc.-II Year-Botany |
| 7. B.Sc.-II Year-Horticulture | 8. B.Sc.-II Year-Agro Chemical Fertilizers |
| 9. B.Sc.-II Year-Analytical Chemistry | 10. B.Sc.-II Year-Biochemistry |
| 11. B.Sc.-II Year-Chemistry | 12. B.Sc.-II Year-Dyes & Drugs Chemistry |
| 13. B.Sc.-II Year-Industrial Chemistry | 14. B.C.A. (Bachelor of Computer Application)-II Year |
| 15. B.I.T. (Bachelor of Information Technology)-II Year | 16. B.Sc.-II Year-Computer Science |
| 17. B.Sc.-II Year-Network Technology | 18. B.Sc.-II Year-Computer Application (Optional) |
| 19. B.Sc.-II Year-Computer Science (Optional) | 20. B.Sc.-II Year-Information Technology (Optional) |
| 21. B.Sc.-II Year-Software Engineering | 22. B.Sc.-II Year-Dairy Science |
| 23. B.Sc.-II Year-Electronics | 24. B.Sc.-II Year-Environmental Science |
| 25. B.Sc.-II Year-Fishery Science | 26. B.Sc.-II Year-Geology |
| 27. B.Sc.-II Year-Mathematics | 28. B.Sc.-II Year-Microbiology |
| 29. B.Sc.-II year Agricultural Microbiology | 30. B.Sc.-II Year-Physics |
| 31. B.Sc.-II Year Statistics | 32. B.Sc.-II Year-Zoology |

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या www.srtmun.ac.in या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी.

‘ज्ञानतीर्थ’ परिसर,
विष्णुपुरी, नांदेड - ४३१ ६०६.
जा.क्र.: शैक्षणिक-१/परिपत्रक/पदवी-सीबीसीएस अभ्यासक्रम/
२०२०-२१/३३३
दिनांक : १५.०७.२०२०.



स्वाक्षरित / -
उपकुलसचिव
शैक्षणिक (१-अभ्यासमंडळ) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :

- १) मा. कुलसचिव यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- २) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- ३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
- ४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
- ५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
- ६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

**SEMESTER PATTERN CURRICULUM
UNDER
CHOICE BASED CREDIT SYSTEM (CBCS)
COURSE STRUCTURE (NEW SCHEME)
B. SC. SECOND YEAR**

SUBJECT: FISHERY SCIENCE

FROM JUNE 2020

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED
Choice Based Credit System (CBCS) Course Structure (New Scheme)
B. Sc. Second Year (III - SEMESTER)
Effective from June 2020
FISHERY SCIENCE

Syllabus Introduction and Outcome

As per the guidelines of University Grant Commission (UGC) New Delhi, Swami Ramanand Teerth Marathwada University, Nanded has implemented choice based credit system (CBCS) pattern at UG and PG level from academic year 2016-17. Revision and updating of the curriculum is perpetual process to impart updated knowledge & technical knowhow to students.

As a part of revision and updating of the curriculum; Swami Ramanand Teerth Marathwad University Nanded, revised syllabus of First Year courses at under graduate as well as post graduate level for the academic year 2019-20. The revised syllabus found very beneficial for the students. The process of revision and implementation of new curriculum for B.Sc. and M.Sc. Second year students have been continued from June 2020 -21.

Newly framed B.Sc. second year syllabus of Fisheries science course has designed according to the 03 year syllabus structure which was submitted in the academic year 2019-2020.

All members of Board of studies in fishery science took lot of efforts to design this new curriculum. The new syllabus includes four theory papers, two practical papers and four Skill Enhancement Course (SEC) paper. Out of four SEC paper student can opt any two SEC paper for completion of second year.

All four theory papers (VI, VII, VIII & IX) and two practical papers (X&XI) of second year have been revised along with changes in titles. Theory Paper-VI entitled “Fish disease management” deals with different types of pathogens which causes diseases, symptoms, etiology of important fish diseases, diagnosis of disease, preventions and treatment of diseases.

Theory Paper- VII, which has title as “Fish developmental biology”, it contains embryonic and post embryonic development of fish, Fish reproduction, parental care in fishes, fecundity, growth study etc. this will be very useful syllabus for students , those are interested to start their own fish farming as business.

Theory Paper- VIII is “Fish preservation and fish byproducts technology” and it is designed on the basis of skill enhancement & job oriented course. Students will be given knowledge as well as technical knowhow with respect to the fish preservation and preparation of different fishery byproducts. After completion of this course student can start their own business.

Theory Paper- IX , entitled as “Fish gear and craft technology, deals with the study of different types of fishing gears and crafts (Mechanized and non mechanized) used in fishing of freshwater as well as marine resources. This paper enlightens students regarding fabrication of

different fishing nets and boats with practical experience. All syllabi are designed as practical based and job oriented.

Practical paper X and XI are based on theory papers VI+VIII and VII + IX respectively. Both practical papers are designed in such a way, to cater the technical and practical knowledge as well as hands-on training with respect to the identification technique of fish pathogens, causes of diseases, identification of fresh fish and spoiled fish, fish preservation methods, preparation of different fishery byproducts, fabrication of fishing nets and boats, etc.

Along with this three year course syllabus, member of the BOS in fishery science also designed four paper of Skill Enhancement Course (SEC), This syllabus is very useful to students for future career. After completion the SEC student can start their own business.

Skill Enhancement course (SEC) are designed with optional papers. During III semester SEC I (A) and SEC I (B) are offered for selection whereas SEC II (A) and SEC II (B) are available for IV Semester. Students can choose any one out of the two available SEC papers for each semester during second year.

SEC I (A) paper is “Manufacturing of fish byproducts”. Under this SEC theory and practical paper, students will be trained for preparation of different fishery byproduct with suitable techniques. SEC I (B) paper is “Freshwater fish production technology”, which deals with scientific techniques of culture of freshwater fish in available water resources.

SEC II (A) paper is “Fish preservation and processing technology”. The syllabus of theory and practical paper is designed in such a way that, students get practical knowledge and technical knowhow regarding processing as well as preservation of fishes.

SEC II (B) paper is entitled “Manufactured of fishing nets”. Under this SEC paper, student will be trained in designing and manufacture of fishing nets through preparation of different models of fishing nets, used in fishing industry.

All papers of skill enhancement course provides technical knowledge to students of fish production technology, preservation of fishes, preparation of different types of by product and fabrication of nets. After completion this course the students can either starts their own business or they will be able to bag good job opportunities in different fish processing industries.

Designing of any curriculum is very difficult task and it not possible with a signal member. After all it is team work. Being a chairman of Board of studies in fishery science, I have endeavored to seek the contribution of all BOS members in fairly good unanimity with one another and have a mention the uniformity of the concept in order to bring out a new curriculum which will be very useful for fishery students. Therefore I am very grateful to all BOS members who have cooperated me very sincerely during designing this syllabus, even in lockdown period due to covid-19 corona pandemic diseases.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED
Choice Based Credit System (CBCS) Course Structure (New Scheme)
B. Sc. Second Year (III - SEMESTER)
Effective from June 2020
FISHERY SCIENCE

Objectives of course

- To introduce and popularize the fisheries education among the society.
- To provide the latest knowledge, tools and techniques of fish production as well as management for fish farmers.
- To make awareness regarding conservation and management of natural freshwater resources and biodiversity.
- To promote the students regarding the research and development in fisheries sector.
- To provide and promote the skill based practical knowledge through skill development courses.
- To create the job opportunities and employment through fisheries education.
- To provide the trained skillful hands to serve in government, private and industrial sector.
- To cater knowledge and technical knowhow on designing and fabrication of fishing gears and crafts.
- To promote the fisheries co-operatives sectors for fish production, marketing and extension to support the national economy through education.
- To acquire the knowledge regarding the fish preservation and fish byproduct technology.
- To obtain the knowledge regarding the fish disease management for high yield production.

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Choice Based Credit System (CBCS) Course Structure (New Scheme)
B. Sc. Second Year (III - SEMESTER)
Effective from June 2020
FISHERY SCIENCE

Class B.Sc. Second Year: Syllabus outline

Semester/ Annual	Course Name.		Paper No.& Title Of paper	Total Periods/ Periods Per week	Marks for		Credits/ Marks
					Internal (CA)	External (ECS)	
Semester III	CCFS-III	Section A	Fish diseases management VI	45 03/week	10	40	Cre. 02 Mar.50
		Section B	Fish developmental Biology VII	45 03/week	10	40	Cre. 02 Mar.50
Annual pattern	SECFS I		Manufacturing of fish byproduct(A) OR Soil & water analysis techniques(B)	25 2+1	25	25	Cre. 02 Mar.50
Semester IV	CCFS- IV	Section A	Fish preservation & fish by production technology VIII	45 03/week	10	40	Cre. 02 Mar.50
		Section B	Fishing craft & gear technology IX	45 03/week	10	40	Cre. 02 Mar.50
Annual pattern	SECFS II		Preservation and Processing Technology(A) OR Manufacturing of fishing nets	25 2+1	25	25	Cre. 02 Mar.50
Annual pattern	CCFSP II		Practical Paper X Based on CCFS VI&VIII	20	10	40	Cre.02 Mar.50
Annual pattern	CCFSP III		Practical Paper XI Based on CCFS VII&IX	20	10	40	Cre.02 Mar.50
Total credits of semester III & IV					110	290	Cre. 16 Mar. 400

CCFS: Core course fishery science, CCFSP Core course fishery science practical.
CA: Continuous assessment, ESE: End of semester examination.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED
Choice Based Credit System (CBCS) Course Structure (New Scheme)
B. Sc. Second Year (III - SEMESTER)
Effective from June 2020
FISHERY SCIENCE
CCFS III (Section-A)
Paper-VI: Fish Diseases Management

Credit 02

Marks 50

period 45

Unit I

1. Cause and development of fish diseases
2. General etiology of fish diseases
3. Extrinsic factors affecting fish health
 - a. Water-associated:(safe levels of water quality) Dissolved oxygen, CO₂, Hardness, Ammonia, pH, Temperature
 - b. Nutrition-associated; Deficiency of vitamin, protein, lipid, minerals and starvation.
4. Common symptoms of stress
5. Effect of stress on a fish health

Unit II

Types of fish diseases

Infectious Fish Diseases: (Disease causing organism, symptoms and preventives measures)

1. Bacterial Diseases: Dropsy and fin rot
2. Viral Diseases: Papillomatosis, Lymphocystosis and Infectious pancreatic necrosis (IPN)
3. Fungal Diseases:-Gill rot, Branchiomycosis (Dermal Mycosis, Branchial mycosis, Systemic mycosis)
4. Epizootic Ulcerative Syndrome (EUS) in fishes.

Unit III

Parasitic diseases of Fish {Disease causing organism, symptoms and preventives measures (Prophylaxis)}

1. Protozoan Diseases:-White spot (Ichthyophthiriasis) and costiasis.
2. Metazoan Diseases:
 - a. Monogenic trematode parasites (Dactylogyrus, Gyrodactylus),
 - b. Digenic trematodes (trematode larval and Neodiplostomum),
 - c. Cestode parasites (Ligula and *Dibothriocephalus latus*),
 - d. Nematodes and fish leeches.
3. Crustaceans diseases: Argulus and Lernia

Unit-IV:

1. Nutrition deficiency diseases: Avitaminosis, Mineral deficiency, Starvation.
2. Environmental induced diseases of fish.
 - a) Gas bubble disease
 - b) Oxygen deficiency,
 - c) Thermal stress
 - d) Stress due to pH variations;
3. Management practices to control fish diseases.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED
Choice Based Credit System (CBCS) Course Structure (New Scheme)
B. Sc. Second Year (III - SEMESTER)
Effective from June 2020
FISHERY SCIENCE
CCFS III (Section-B)
Paper VII: Fish Developmental Biology

Credit 02

Marks 50

period 45

Unit – I Developmental biology

1. Types of fishes based on reproduction: Oviparity, viviparity & ovo-viviparity
2. Gametogenesis in fishes: Oogenesis and spermatogenesis
3. Types of eggs
4. Fertilization of egg
5. Cleavage

Unit – II Developmental biology

1. Morula
2. Blastula
3. Fate map of Blastula
4. Gastrulation
5. Hatching and post embryonic development.

Unit – III Reproductive biology

1. Sexual dimorphism in Fishes.
2. Parental care in fish
3. Maturity stages in male and female fish (Teleost)
4. Assessment of fecundity: i) Volumetric method ii) Gravimetric method iii) Von Bayer's methods
5. Study of Gonado Somatic Index (GSI).

Unit – IV Growth studies

1. Introduction to growth
2. Factors affecting growth in fish
3. Ponderal index
4. Length- weight relationship
5. Methods for age and growth determination in fishes: a) Direct method b) Tagging method c) Marking method d) Counting rings on hard body parts (Scale & otolith) e) Radio carbon uptake method f) RNA– DNA ratio method

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED
Choice Based Credit System (CBCS) Course Structure (New Scheme)
B. Sc. Second Year (IV - SEMESTER)
Effective from June 2020
FISHERY SCIENCE
CCFS IV (Section-A)

Paper VIII: Fish Preservation & Fish by Product Technology

Credit 02

Marks 50

period 45

Unit – I: Fish spoilage

1. Introduction
2. Biochemical composition of fish
3. Causes of fish spoilage: Chemical, Bacterial, Enzymatic
4. Post mortem changes in fish: Rigor Mortis
5. Test for freshness of fish: Chemical, organoleptic
6. Sources of contamination of fish.

Unit II- Fish Preservation

1. Introduction
2. Principles of preservation: - Washing, gutting, lowering the temperature, rising the temperature, dehydration, use of salt, use of preservatives.
3. Methods of Preservation:-
 - a) Drying: Sun drying, Mechanical drying, Freeze drying
 - b) Salting: Dry salting, Wet salting/ Brining, Kench salting, Mona salting, Pit salting
 - c) Freezing: Plate freezing, Blast freezing, deep freezing, Quick freezing
 - d) Chilling
 - e) Storing in cold storage.
 - f) Canning
 - g) Smoking
 - h) Pickling

Unit – III Fish Byproducts Technique:

1. Different types of fish by-products:
 - a) Fish oil: Body oil, liver oil
 - b) Fish meal
 - c) Fish Guanos
 - d) Fish flour
 - e) Fish manure
 - f) Prawn manure
 - g) Fish glue
 - h) Isinglass
 - i) Fish Silage
 - j) Fish skin

Unit IV: Problems in fish preservation.

1. Denaturation due to freezing
2. Food poisoning and allergies from fish food.
3. Food poisoning from consumption poisonous fish.
4. Food poisoning of bacterial origin.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED
Choice Based Credit System (CBCS) Course Structure (New Scheme)
B. Sc. Second Year (IV - SEMESTER)
Effective from June 2020
FISHERY SCIENCE
CCFS IV (Section-B)
Paper IX: Fishing Gear and Craft Technology

Credit 02

Marks 50

period 45

Unit I Fishing Gears

1. Introduction and classification of fishing gears
2. Fabrication of fishing gear
3. Material used in manufacture of fishing gear
4. Fishing gear accessories
5. Care, maintenance and preservation of fishing gear

Unit II Fishing craft

1. Introduction and classification of fishing craft
2. Material used for manufacture of fishing craft
3. Fishing craft accessories/deck equipments
4. Care and maintenance of fishing crafts
5. Different fishing crafts: i) Inland fishing crafts ii) Sea fishing crafts;

Unit III Fishing Methods

1. History/Evolution of Fishing
2. Methods of Fishing
 - a. Traditional methods: Catching by hand, fishing by hunting, fishing by plant poisons, Hooks and lines fishing, Trolling
 - b. Conventional Methods:
 - i. Active netting: Cast net, Dip Net, Bag net, Drag net, Purse seine net, Trawl net, Rampani net
 - ii. Passive netting: Gill net, Drift net, Trammel net, Fixed bag net, Fixed traps

Unit IV Unconventional fishing methods and equipments

1. Unconventional fishing methods: a. Light Fishing b. Electro fishing c. Jigging
2. Equipments: a. Fish Finder/Ecosounder b. SONAR c. RADAR d. GPS e. Radio

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED
Choice Based Credit System (CBCS) Course Structure (New Scheme)
B. Sc. Second Year (III & IV- SEMESTER)
Effective from June 2020
FISHERY SCIENCE
CCFSPR II (P-X)

Paper X: Practical Paper based on Theory Paper VI & VIII

1. Water analysis: a) Dissolved oxygen b) Dissolved CO₂ c) Chlorides d) Carbonates
e) pH by pH meter
2. Isolation of microorganism's (bacteria & fungi) from fish (Streak plate method).
3. Preparation and identification of fish fungal parasites
4. Staining: Monochrome staining and Gram staining
5. Identification of spoiled and fresh fishes
6. Identification of fish parasites : a) Ichthyophthirius b) Pseudomonas bacteria c)
Saprolegnia d) Branchiomyces e) Dactylogyrus f) Gyrodactylus g) Dibothryoccephalus h)
Ligula i) fish leech j) Argulus k) Larnaea
7. Fish processing: washing, gutting, cleaning of locally available fish
8. Preservation of locally available fish by mechanical drying method
9. Preservation of local available fish by Ratnagiri method
10. Estimation of fats
11. Estimation of proteins
12. Estimation of carbohydrates
13. Preparation of fish fry/fish curry/ fish pickles
14. Preparation of byproducts
15. Visit to fish market/fish processing unit

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED
Choice Based Credit System (CBCS) Course Structure (New Scheme)
B. Sc. Second Year (III & IV- SEMESTER)
Effective from June 2020
FISHERY SCIENCE
CCFSPR III (P-XI)
Paper XI: Practical Paper based on Theory Paper VII & IX

1. Study of embryonic development stages
2. Study of sexual dimorphism
3. Study of parental care in fishes
4. Study of gonads
5. Estimation of fish fecundity
6. Study of length weight relationship
7. Identification of spawn fry and fingerlings
8. Study of fishing gears (any four)
9. Study of fishing hooks & lines
10. Study of fishing crafts (any four)
11. Study of fishing gear accessories
12. Fabrication of fishing nets
13. Study of fishing crafts materials
14. Submission of prepare models of fishing crafts and gears
15. Visit to fish landing centers/ fish markets
16. Micro techniques: Block preparation, section cutting, staining of Ovary and Testes

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

B. Sc. Second Year (CBCS Pattern)

Effective from June 2020

Semester- III & IV

Subject: - Fishery Science

Paper X: Practical (based on Theory Paper VI & VIII)

Time: 4 hrs.

Marks: 40

Batch No:

Date:

- Q.1) Identify, classify and comments on disease causing organisms (any three) 09
- Q.2) Identify and Comments on fish by-products (any two) 06
- Q.3) Identify and mounting of disease causing organism from provided sample 09

Or

Estimate the amount of Protein / Carbohydrates / Lipid from given sample

(Tissue / By-product)

- Q.4) Estimate the amount of.....from given water sample. (Any one) 08

(Dissolved Oxygen/Free Co₂/Chloride)

- Q.5) Staining and identification of microbial culture /material 08

Or

Preserve the given fish by.....method and write process of its preservation.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
B. Sc. Second Year (CBCS Pattern)
Effective from June 2020
Semester- III & IV
Subject: - Fishery Science
Paper XI: Practical (based on Theory Paper VII & IX)

Time: 4 hrs.

Marks: 40

Batch No:

Date:

-
- Q.1) Identify and comments on Sexual dimorphism, parental care, Gonads 09
(One from each)
- Q.2) Identify and Comments on fishing craft and fishing gear (one each) 06
- Q.3).Identify and comments on developmental stages of fish growth (any two) 06
Or
Fabricate netting from given twin and accessories.
- Q.4) Estimate the fecundity of fish by provided ovary 10
- Q.5) Estimate Length weight relationship of provided fishes.
Or
Perform and write any one part of Micro technique of tissue provided. 09
(Block preparation/Section cutting/Staining)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

B. Sc. Second Year (CBCS Pattern)

Semester- III&IV

Effective from June 2020

Skill Enhancement Course

(Any One to each semester) (Credit: 02 each)

Semester III SEC- I

A) Manufacturing of fish by products.

OR

B) Fresh water fish production technology

Semester IV SEC – II

A) Fish Preservation and Processing Technology

OR

B) Manufacturing of fishing nets

A: Manufacturing of fish by-products. (25 theory periods)

1. Sorting and grading of fish catch
2. Fish Spoilage: causes of fish spoilage
3. Nutritional value of fish.
4. Biochemical composition of raw fish
5. Calorific value of fish.
6. Preparation of Fish manure, Fish meal, Fish body oil, Fish liver oil, Fish Maws & Isinglass, Fish Silage / Ensilage Fish Glue, Fish Gelatin, Pearl Essence
7. Preparation of prawn pickles, Fish pickle, clam pickle,
8. Preparation of Fermented Fish sauce.
9. Preparation of Dried prawn.

Practical based on theory paper

B: Fresh Water Fish Production Technology. (25 Theory periods)

1. Introduction of aquaculture
2. Topography
3. Analysis and maintenance of water quality
4. Analysis and maintenance of soil quality
5. Lay out plan of fish farm
6. Construction of different types of ponds
7. Management of fertilizers
8. Induced breeding technique
9. Fish seed identification technique
10. Fish seed packing and transport
11. Disease management

Practical's based on theory syllabus

A) Fish Preservation and Processing Technology. (25 Theory Periods)

1. Study of fish spoilage- Bacterial, Enzymatic and Chemical.
2. Study of Rigor-mortis
 - a. Causes of Rigor-mortis,
 - b. Factors responsible for prolongation of Rigor-mortis,
 - c. Identification of fresh and spoiled fish
3. Principles of Preservations
 - a. Cleaning and gutting,
 - b. Lowering temperature
 - c. Increasing the temperature
 - d. Dehydration,
 - e. Use of salts and Preservatives,
 - f. Use of Natural Preservatives
4. Methods of Fish Preservations
 - a. Refrigeration,
 - b. Deep Freezing,
 - c. Freeze Drying
 - d. Salting: Dry salting, Wet salting, Brine salting, Cold salting,
 - e. Smoking,
 - f. Drying – Natural drying, Artificial Drying,
 - g. Canning,
 - h. Demerits' of Fish Preservation

Syllabus: SEC –II

B. Manufacturing of Fishing Nets. (25 Theory Periods)

1. Fishing gear materials and accessories
2. Fishing gear materials- a) Classification of fishing gear materials: Natural fibers, synthetic fibers, and Basic fiber forms
3. Properties of fibers: a) Physical properties, b) Chemical properties, c) Biological properties
4. Identification of synthetic netting yarns
5. Construction of netting yarns, b) Twist- types of twists
6. Ropes- Types and Classification of ropes
7. Floats- classification of floats
8. Sinkers- types of sinkers
9. Buoys- Types of buoys
10. Anchors- Parts and Types
11. Fishing gear accessories
12. Care and Maintenance of fishing gear
13. Fabrication of fishing gear- Braiding, Tailoring of webbing, Knots, Bends, Hitches etc.

Practical's based on Theory syllabus

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