॥ सा विद्या या विमुक्तये ॥

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

'ज्ञानतीर्थ', विष्णुपुरी, नांदेड – ४३१ ६०६ (महाराष्ट्र राज्य) भारत

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

'Dnyanteerth', Vishnupuri, Nanded - 431 606 (Maharashtra State) INDIA

Established on 17th September, 1994, Recognized By the UGC U/s 2(f) and 12(B), NAAC Re-accredited with'B++' grade

Fax : (02462) 215572 | **Academic-1 (BOS) Section** | website: srtmun.ac.in

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विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत राष्ट्रीय शैक्षणिक धोरण २०२० नुसार पदवी द्वितीय वर्षाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२५–२६ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, दिनांक २७ मे २०२५ रोजी संपन्न झालेल्या मा. विद्यापरिषद बैठकीतील विषय क्रमांक १६/६१–२०२५ च्या ठरावानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील राष्ट्रीय शैक्षणिक धोरण–२०२० नुसारचे पदवी द्वितीय वर्षाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२५–२६ पासून लागू करण्यास मा. विद्यापरिषदेने मान्यता प्रदान केली आहे. त्यानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील बी. एस्सी द्वितीय वर्षाचे खालील विषयाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२५–२६ पासून लागू करण्यात येत आहेत.

01	B.Sc. Agriculture Microbiology	11	B.Sc. Physics
02	B.Sc. Botany	12	B.Sc. Seed Technology
03	B.Sc. Dairy Science	13	B.Sc. Horticulture
04	B.Sc. Electronics	14	B.Sc. Statistics
05	B.Sc. Environmental Science	15	B.Sc. Biochemistry
06	B.Sc. Fishery Science	16	B.Sc. Analytical Chemistry
07	B.Sc. Food Science	17	B.Sc. Agrochemical & Fertilizers
08	B.Sc. Geology	18	B.Sc. Industrial Chemistry
09	B.Sc./B.A. Mathematics	19	B.Sc. Industrial Microbiology
10	B.Sc. Microbiology		

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

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.:शै–१/एनइपी/विवत्रंविपदवी/२०२५–२६/११६
दिनांक ०५.०६.२०२५

सहाय्यक कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत : माहितीस्तव तथा कार्यवाहीस्तव.
१) मा. कुलगुरू महोदयांचे कार्यलय, प्रस्तुत विद्यापीठ.
२) मा. प्र. कुलगुरू महोदयांचे कार्यलय, प्रस्तुत विद्यापीठ.
३) मा. आधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
४) मा. संचालक, परीक्षा व मुंल्यमापन मंडळ, प्रस्तुत विद्यापीठ.
५) मा. प्राचार्य, सर्व संबधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
६) सिस्टीम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. याना देवून कळविण्यात येते की, परिपत्रक अभ्यासक्रम संकेतस्थळावर प्रसिध्द करण्यात यावेत.

SWAMI RAM SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED - 431 606

(Credit Framework and Structure of Four Year UG Program with Multiple Entry and Exit Option as per NEP-2020)

UNDERGRADUATE PROGRAMME OF

SCIENCE & TECHNOLOGY

B.Sc. Second Year

SUB – FISHERY SCIENCE

Major in DSC and Minor in DSM (Subject)

Under the Faculty of Science & Technology

(Revised as per the Govt. Of Maharashtra circular dt. 13th March 2024)

With effect from June 2025

Effective from the Academic Year 2025 – 2026
(As per NEP-2020)

स्वामी रामानंद तीर्थ
मराठवाडा विद्यापीठ, नांदेड

Details of the Board of Studies Members in the subject Fishery Science under the faculty of Science & Technology of S.R.T.M. University, Nanded

01.	**Dr. Sunil Deoram Ahirrao** Department of Fishery Science Shri. Shivaji College, Parbhani	**Chairman**
02.	**Dr. K. S. Shillewar** Department of Fishery Science Science College, Nanded	**Member**
03.	**Dr. Seema Shesherao Korde,** Department of Fishery Science Azad Mahavidyalaya, Ausa, Dist. Latur.	**Member**
04.	**Dr. Shivaji Prabhakar Chavan** School of Life Sciences, SRTM University Nanded	**Member**
05	**Dr. Guiab D. Khedkar** Dr. Babasaheb Ambedkar Marathwada University, Sambhaji Nagar	**Member**
06.	**Dr. Madhuri Shrikant Pathak** ICAR- Central Institute of Fisheries Education (ICAR-CIFE) Panch Marg. Off Yari Road Mumbai	**Member**
07.	**Dr. Manoj M. Sharma** F/ 17-18, Raj Green Heights, Behind ICICI bank, Rander Road, Jahangirpura, Surat- 395005	**Member**
08.	**Dr. Dhanaji Waman Patil** Department of Fishery Science, Toshniwal Arts Commerce and Science College, Sengaon, Dist. Hingoli	**Invitee Member**
09.	**Dr. Sandip Surendra Markad** Department of Fishery Science Toshniwal Arts Commerce and Science College, Sengaon, Dist. Hingoli	**Invitee Member**
10.	**Jadhav Madhura Mohanrao** UG, Dayanand Science College, Latur MPUA u/s 40(2)(d)(E) Invitee Member 2024 UG & PG Student	**Student Member**

Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science & Technology

Subject: Fishery Science

B.Sc. Second Year Semester III (Level 5.0)

Teaching Scheme Fishery Science

Subject	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs/ week)	
			Theory	Practical	Total	Theory	Practical
Major	SFISCT1201	Freshwater Fish Breeding Technique and Hatcheries Management	02	--	**02**	02	--
	SFISCT1202	Aquatic ecology	02	--	**02**	02	--
	SFISCP1201	Practical based on SFISCT1201	--	02	**02**	--	04
	SFISCP1202	Practical based on SFISCT1202	--	02	**02**	--	04
Minor	SFISMT1201	Culture of shellfishes	02	--	**02**	02	--
	SFISMP1201	Practical based on SFISMT1201	--	02	**02**	--	04
Generic Electives *(from other Faculty)*	SFISGE1201	Manufacturing of organic fertilizers	02	--	**02**	02	--
Vocational Skill Course (related to Major)	SFISVSC1201	Water analysis tools and techniques	--	02	**02**	--	04
Total Credits			**08**	**08**	**16**	**08**	**16**

Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science & Technology

Subject: Fishery Science

B.Sc. Second Year Semester III (Level 5.0)

Examination Scheme Fishery Science

[20% Continuous Assessment (*CA)* and 80% End Semester Assessment (*ESA*)]

Subject	Course Code	Course Name	Theory				Practical		Total Col (6+7)/ Col (8+9)
			Continuous Assessment (CA)			ESA			
			Test 1	Test 2	Average of T1 & T2	Total	CA	ESA	
01	*02*	*03*	**04**	**05**	**06**	**07**	**08**	**09**	**10**
Major	SFISCT1201	Freshwater Fish Breeding Technique and Hatcheries Management	10	10	10	**40**	--	--	**50**
	SFISCT1202	Aquatic ecology	10	10	10	**40**	--	--	**50**
	SFISCP1201	Practical based on SFISCT1201	--	--	--	--	20	30	**50**
	SFISCP1202	Practical based on SFISCT1202	--	--	--	--	20	30	**50**
Minor	SFISMT1201	Culture of shellfishes	10	10	10	**40**	--	--	**50**
	SFISMP1201	Practical based on SFISMT1201	--	--	--	--	20	30	**50**
Generic Electives *(from other Faculty)*	SFISGE1201	Manufacturing of organic fertilizers	10	10	10	**40**	--	--	**50**
Vocational Skill Course (related to Major)	SFISVSC1201	Water analysis tools and techniques	--	--	--	--	20	30	**50**
									400

Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science & Technology

Subject: Fishery Science

B.Sc. Second Year Semester IV (Level 5.0)

Teaching Scheme Fishery Science

Subject	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs/ week)	
			Theory	Practical	Total	Theory	Practical
Major	SFISCT1251	Fish Spoilage, Preservation and Quality Issues	02	--	**02**	02	--
	SFISCT1252	Fish Products and Byproducts Technology	02	--	**02**	02	--
	SFISCP1251	Practical based on SFISCT1251	--	02	**02**	--	04
	SFISCP1252	Practical based on SFISCT1252	--	02	**02**	--	04
Minor	SFISMT1251	Preparation of Value Added Products	02	--	**02**	02	--
	SFISMP1251	Practical based on SFISMT1251	--	02	**02**	--	04
Generic Electives *(from other Faculty)*	SFISGE1251	Fabrication and Maintenance of Aquarium	02	--	**02**	02	--
Vocational Skill Course (related to Major)	SFISVSC1251	Fish Spoilage, Preservation, Byproducts and Quality Issues	--	02	**02**	--	04
Total Credits			**08**	**08**	**16**	**08**	**16**

Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science & Technology

Subject: Fishery Science

B.Sc. Second Year Semester IV (Level 5.0)

Examination Scheme Fishery Science

[20% Continuous Assessment (*CA)* and 80% End Semester Assessment (*ESA*)]

Subject	Course Code	Course Name	Theory				Practical		Total Col (6+7)/ Col (8+9)
			Continuous Assessment (CA)			ESA			
			Test 1	Test 2	Average of T1 & T2	Total	CA	ESA	
01	*02*	*03*	**04**	**05**	**06**	**07**	**08**	**09**	**10**
Major	SFISCT1251	Fish Spoilage, Preservation and Quality Issues	10	10	10	**40**	--	--	**50**
	SFISCT1252	Fish Products and Byproducts Technology	10	10	10	**40**	--	--	**50**
	SFISCP1251	Practical based on SFISCT1251	--	--	--	--	20	30	**50**
	SFISCP1252	Practical based on SFISCT1252	--	--	--	--	20	30	**50**
Minor	SFISMT1251	Preparation of Value Added Products	10	10	10	**40**	--	--	**50**
	SFISMP1251	Practical based on SFISMT1251	--	--	--	--	20	30	**50**
Generic Electives *(from other Faculty)*	SFISGE1251	Fabrication and Maintenance of Aquarium	10	10	10	**40**	--	--	**50**
Vocational Skill Course (related to Major)	SFISVSC1251	Water analysis tools and techniques	--	--	--	--	20	30	**50**
									400

Course objectives:

1. To get the knowledge of breeding and hatchery management of freshwater fish species.
2. To acquire hands-on experience on induced breeding and hatchery management of commercially important fish species.
3. To get knowledge on aquatic ecology and study different aquatic ecosystems
4. To get thorough knowledge and technical knowhow on culture of Freshwater prawn
5. To acquire detailed knowledge on production of different organic fertilizers
6. To get detailed information on fish spoilage, associated quality issues and its causes.
7. To study preparation of different products and byproducts of fish origin.
8. To get thorough information on preparation of different value added fish products.
9. To acquire thorough information and technical knowhow on aquarium fabrication and management.

Course outcomes:

1. Students will get detailed information and technical information on induced breeding and hatchery management for seed production of commercially important freshwater fish species.
2. Students will gain thorough knowledge about different aquatic ecology.
3. Student will acquire detailed information and technical knowhow regarding culture of freshwater prawn.
4. Students will get thorough technical knowledge regarding manufacture of organic fertilizers.
5. The student will get thorough understanding with respect to fish spoilage, quality and principles as well as methods of fish preservation.
6. Students will acquire detailed information regarding different types and production methods of fish byproducts.
7. Students will get thorough understanding regarding preparation of various value added fish products.
8. Students will get detailed information on fabrication and management of aquarium.

Periods: 30 **No. of Credits: 02** **Marks: 50**

Major Course (Theory)

SFISCT1201: Freshwater Fish Breeding Technique and Hatcheries Management

Module	Unit	Title of topic	hrs
1		**Unit-I: Bundh breeding and induced breeding of fishes**	08
	1.1	Bundh breeding: a. Types of bundhs: Wet bundh, Dry Bundh, Modern bundh b. Breeding operation in bundhs c. Factors responsible for bundh breeding	
	1.2	Artificial fertilization by striping: a) Dry striping b) Wet striping	
	1.3	Induced breeding by Hypophysation: Fish pituitary gland (PG), Collection of PG, Preservation of PG, Preparation of PG Extract	
2		**Unit-II: Operation and management of different hatcheries**	07
	2.1	Hatching hapa	
	2.2	Glass jar hatchery	
	2.3	Plastic bin hatchery	
	2.4	CIFE D 80 (Dwivedi 80)	
	2.5	Chinese Circular hatchery	
3		**Unit-III: Induced breeding of striped Murrel - *Channa striatus***	07
	3.1	Brood stock management	
	3.2	Food and feeding management	
	3.3	Preparation and implementation of hormone and pellet	
	3.4	Identification of and selection of brooders	
	3.5	Breeding operation	
	3.6	Incubation and hatchery: Hatching tank management	
	3.7	Larval rearing: Nursing phase (spawn to fry), Rearing phase (fry to fingerling)	
	3.8	Larval feed management	
	3.9	Water quality	
4		**Unit-IV: Induced breeding of Magur-*Clarias batrachus***	08
	4.1	Brood stock management	
	4.2	Selection of brooders	
	4.3	Induced breeding operation: Preparation of Sperm suspension; extraction of ova from female, artificial Fertilization	
	4.4	Incubation and hatchery, Flow through hatchery	
	4.5	Larval rearing: Nursery phase, Rearing phase	
	4.6	Larval feed management	
	4.7	Water quality	

Periods: 30 **No. of Credits: 02** **Marks: 50**

Major Course (Theory)

SFISCT1202: Aquatic Ecology

Module	Unit	Title of topic	hrs
1		**Unit-I: River ecosystem**	08
	1.1	Introduction to river ecosystem	
	1.2	Physico-chemical characteristics	
	1.3	Biotic factors-Producers, consumers and decomposer.	
	1.4	Zonation of river	
	1.5	Flora and fauna of rivers	
2		**Unit-II: Lake Ecosystem**	07
	2.1	Introduction to lake ecosystem	
	2.2	Physico-chemical characteristics	
	2.3	Biotic factors	
	2.4	Zonation of lake	
	2.5	Types and classification of lake	
	2.6	Flora and fauna of lake	
	2.7	Community of lentic system	
		-Producers	
		-Consumers	
		-Decomposers	
3		**Unit-III: Marine ecosystem**	07
	3.1	Introduction to marine ecosystem	
	3.2	Physico-chemical properties	
	3.3	Zonation of sea	
	3.4	Flora and fauna of sea	
	3.5	Food web and food chain	
4		**Unit-IV: Energy flow in ecosystem**	08
	4.1	Introduction	
	4.2	Water cycle	
	4.3	Carbon cycle	
	4.4	Oxygen cycle	
	4.5	Nitrogen cycle	

Periods: 30 **No. of Credits: 02** **Marks: 50**

Major Course (Practical)

SFISCP1201: Practical based on SFISCT1201 (Freshwater Fish Breeding Technique and Hatcheries Management)

Module	Unit	Title of topic	hrs
1	1	Fish identification: Rohu, Catla, Mrigal, Murrel, Magur.	60
	2	Dissection of IMC/ Murrel / Magur / any locally available fish for removal of pituitary gland.	
	3	Identification of various fish seed stages. (spawn, fry and fingerlings)	
	4	Preparation of pituitary gland extract and administration of injection.	
	5	Study of Phytoplanktons.	
	6	Study of Zooplanktons	
	7	Water quality (DO, CO_2, pH, Salinity)	
	8	Study of hatchery models: i) Hapa ii) Plastic bin hatchery iii) Glass jar iv) CIFE D-80 Model v) Chinese hatchery	
	9	Preparation and submission of any one hatchery model	
	10	Visit to fish farm and submission of report	

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Faculty of Science and Technology

B. Sc. Second Year (NEP 2020)

Effective from June 2025 Semester- III

Subject: Fishery Science

Major Course (Practical)

SFISCP1201 practical based on SFISCT1201

(Freshwater Fish Breeding Technique and Hatcheries Management)

Centre:

Date: **Time:** **Batch No.:**

Credits: 02 **Marks: 30**

Q. 1	Dissect IMC/ Murrel / Magur / any locally available fish for removal of pituitary gland	09
Q. 2	Identify and comment on given specimen (One fish Species, One fish seed stage, One Plankton) a. b. c.	09
Q. 3	Estimate ……from given water sample. (Dissolved Oxygen, Free carbon dioxide)	08
Q. 4	Submission of model/Viva-voce	04

Periods: 30 **No. of Credits: 02** **Marks: 50**

Major Course (Practical)

SFISCP1202: Practical based on SFISCT1202 (Aquatic Ecology)

Module	Unit	Title of topic	hrs
1	1	Estimation of DO from Water	60
	2	Estimation of CO2 of Water	
	3	Estimation of salinity of Water	
	4	Estimation of turbidity of Water	
	5	Estimation of pH of water	
	6	Identification of aquatic insects	
	7	Identification of aquatic weeds	
	8	Estimation of available nitrogen from soil	
	9	Estimation of available phosphorus from soil	
	10	Estimation of available potassium from soil	
	11	Estimation of pH of soil.	
	12	Preparation of permanent slides and identification of planktons	

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Faculty of Science and Technology

B. Sc. Second Year (NEP 2020)

Effective from June 2025 Semester- III

Subject: Fishery Science

Major Course (Practical)

SFISCP1202 practical based on SFISCT1202

(Aquatic Ecology)

Centre:

Date: **Time:** **Batch No.:**

Credits: 02 **Marks: 30**

Q. 1 Estimate ……from given water sample. 09
(Dissolved Oxygen, Free carbon dioxide, Salinity)

OR

Estimate ……from given soil sample.
(nitrogen, phosphorus, potassium)

Q. 2 Identify and comment on given specimen (Any four from Phytoplankton, Zooplankton, Aquatic insect, aquatic weed) 08

a.

b.

c.

Q. 3 Preparation of permanent slide of plankton. Identify and comment on specimen. 09

Q. 4 Submission of model/slides/Viva-voce 04

Periods: 30 **No. of Credits: 02** **Marks: 50**

Minor Course (Theory)
SFISMT1201: Culture of shellfishes

Module	Unit	Title of topic	hrs
1		**Unit-I: Culture of giant freshwater prawn**	08
	1.1	Introduction to giant Freshwater Prawn - *Macrobrachium rosenbergii*	
	1.2	Biology of Freshwater Prawn: Morphology, Life cycle, food and feeding, reproduction	
	1.3	Seed production	
	1.4	Pond Culture of Freshwater Prawn	
		- Pre-stocking management	
		- Stocking management	
		- Post stocking management	
2		**Unit-II: Culture of Tiger Shrimp**	07
	2.1	Introduction to Tiger Shrimp (*Penaeus monodon*)	
	2.2	Biology of Tiger Shrimp: Morphology, Life cycle, food and feeding, reproduction	
	2.3	Seed supply and resources	
	2.4	Pond Culture of Tiger Shrimp	
		- Pre-stocking management	
		- Stocking management	
		- Post stocking management	
3		**Unit-III: Culture of Mud crab**	
	3.1	Introduction to mud crabs (*Scylla serrata, Scylla tranquebarica*)	08
	3.2	Biology of mub crab: Morphology, Life cycle, food and feeding, reproduction	
	3.3	Seed resources and seed supply	
	3.4	Culture practices of mud crab	
		- Pre-stocking management	
		- Stocking management	
		- Post stocking management	
	3.5	Fattening of crabs	
4		**Unit-IV: Pearl culture**	07
	4.1	Introduction	
	4.2	Important pearl oyster species : *Pinctada maxima, P. fucata* and *P. margaritifera*	
	4.3	Biology of Pearl oyster: Morphology, Food and feeding, life cycle, reproduction	
	4.4	Development of pearl (Pearl formation)	
	4.5	Culture methods :	
		- Pre-stocking management	
		- Stocking management	
		- Post stocking management	

Periods: 30 **No. of Credits: 02** **Marks: 50**

Minor Course (Practical)

SFISMP1201: Practical based on SFISMT1201 (Culture of shellfishes)

Module	Unit	Title of Practical	hrs
1	1	Morphological study: - Giant Freshwater prawn - Tiger Shrimp - Mud Crab - Pearl oyster	60
	2	Study of morphometric parameters of shellfishes.	
	3	Sexual dimorphism: - Giant Freshwater prawn - Tiger Shrimp - Mud Crab - Pearl oyster	
	4	Dissection of shellfish (Giant Freshwater prawn, Tiger Shrimp, Mud Crab, Pearl oyster) - Digestive system, reproductive system, Respiratory system, circulatory system	
	5	**Study of lifecycle and Life stage :** - Giant Freshwater prawn - Tiger Shrimp - Mud Crab - Pearl oyster	
	6	Study of pearl formation.	
	7	Study of fattening in mud crabs	
	8	Eyestalk ablation of shrimp	
	9	Study of implant for pearl culture	
	10	Preparation and submission of models (Morphology, life cycle, etc)	

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Faculty of Science and Technology

B. Sc. Second Year (NEP 2020)

Effective from June 2025 Semester- III

Subject: Fishery Science

Minor Course (Practical)

SFISMP1201 practical based on SFISMT1201

(Culture of shellfishes)

Centre:

Date: **Time:** **Batch No.:**

Credits: 02 **Marks: 30**

Q. 1 Dissect available shellfish (Freshwater prawn / Tiger Shrimp / Mud Crab / Pearl oyster) for ……
(digestive system/Circulatory system/reproductive system) 10

Q. 2 Estimate morphometric parameters of given shellfish specimens 08

OR

Carry out eyestalk ablation of shrimp/ Implant given graft for pearl culture

Q. 3 Identify and comment on given spots (Any four from Shellfish species, Life stages, sexual dimorphism,) 08

a.

b.

c.

d.

Q. 4 Submission of model/Viva-voce 04

Periods: 30 **No. of Credits: 02** **Marks: 50**

Generic Elective (Theory)

SFISGE1201: Manufacturing of Organic Fertilizers

Module	Unit	Title of topic	hrs
1		**Unit-I: Production of Farmyard manure (FYM)**	08
	1.1	Preparation of farm yard manure	
	1.2	Composition of farm yard manure	
	1.3	Characteristic of farm yard manure	
	1.4	Application in aquaculture	
	1.5	Application in agriculture	
	1.6	Precautions and safety measures	
	1.7	Difference between organic manures and fertilizers	
2		**Unit-II: Production of Cow dung manure (CDM)**	08
	2.1	Preparation of CDM	
	2.2	Composition of CDM	
	2.3	Characteristic of CDM	
	2.4	Application in aquaculture	
	2.5	Application in agriculture	
	2.6	Precautions and safety measures	
3		**Unit-III: Production of Vermicompost manure (VCM)**	07
	3.1	Preparation of VCM	
	3.2	Composition of VCM	
	3.3	Characteristic of VCM	
	3.4	Application in aquaculture	
	3.5	Application in agriculture	
	3.6	Precautions and safety measures	
4		**Unit-IV: Production of Domestic waste manure (DWM)**	07
	4.1	Preparation of DWM	
	4.2	Composition of DWM	
	4.3	Characteristic of DWM	
	4.4	Application in aquaculture	
	4.5	Application in agriculture	
	4.6	Precautions and safety measures	

Periods: 30 **No. of Credits: 02** **Marks: 50**

Skill Based Course (Practical)

SFISVSC1201: Water analysis tools and techniques

Module	Unit	Title of topic	hrs
1		**Tools used for water analysis**	60
	1	DO meter	
	2	Turbidity meter	
	3	pH meter	
	4	Conductivity meter	
	5	TDS meter	
	6	Calorimeter	
	7	Salinity meter	
	8	Spectrophotometer	
		Water analysis	
	1	Dissolved oxygen	
	2	CO_2	
	3	pH	
	4	Salinity	
	5	Electrical conductivity	
	6	Turbidity	
	7	Hardness	
	8	Chlorides	
	9	Total dissolved solids (TDS)	
	10	Total coliform count	

Periods: 30 **No. of Credits: 02** **Marks: 50**

Major Course (Theory)

SFISCT1251: Fish Spoilage, Preservation and Quality Issues

Module	Unit	Title of topic			hrs
1		**Unit-I: Fish Spoilage**			07
	1.1	Introduction			
	1.2	Causes of spoilage - Chemical, Microbial, Enzymatic			
	1.3	Sources of contamination			
	1.4	Test of freshness - Chemical and organoleptic			
2		**Unit-II: Fish processing**			
	2.1	Stunning of fish	2.7	Gutting	
	2.2	Grading	2.8	Fin cutting	08
	2.3	Removal of slime	2.9	Filleting	
	2.4	Scaling	2.10	Skinning	
	2.5	Washing	2.11	Meat bone separation	
	2.6	Deheading	2.12	Benefits of processing	
3		**Unit-III: Fish preservation**			
	3.1	Principal of fish preservation			
	3.2	Fish processing			
	3.3	Methods of fish preservation			
		i. Drying - Sundrying, Mechanical drying and Freeze drying			
		ii. Salting - Dry salting, Wet salting, Kench salting, Monacuring.			08
		iii. Freezing - Plate freezing, Blast freezing, Deep freezing			
		iv. Canning			
		v. Smoking			
		vi. Pickling			
4		**Unit-IV: General quality issues in fish preservation**			
	4.1	Quality issue in chilled fish			
	4.2	Quality issue in frozen fish			07
	4.3	Quality issue in dried fish			
	4.4	Quality issue in minced fish products			

Periods: 30 **No. of Credits: 02** **Marks: 50**

Major Course (Theory)

SFISCT1252: Fish Products and Byproducts Technology

Module	Unit	Title of topic			hrs
1		**Unit-I: Extraction of fish oil**			08
	1.1	Composition of fish oil			
	1.2	Raw material used for fish oil			
	1.3	Methods of extraction of fish oil			
	1.4	Processing of fish oil			
	1.5	Uses of fish oil			
2		**Unit-II: Fish meal production**			07
	2.1	Introduction			
	2.2	Preparation of fish meal			
	2.3	Raw material used			
	2.4	Processing method: i) Wet method; ii) Dry method			
	2.5	Equipments used			
	2.6	Uses of fish meal			
3		**Unit-III: Preparation of Chitin and Chitosan**			07
	3.1	Chitin and Chitosan			
	3.2	Characteristic of Chitin and Chitosan			
	3.3	Preparation of Chitin			
	3.4	Standardization of Vit A potency			
	3.5	Use of Chitin and Chitosan			
4		**Unit-IV: Other fish byproducts**			
	4.1	Fish protein concentrate	4.6	Collagen	08
	4.2	Gelatin	4.7	Fish floor (Hydrolysed protein)	
	4.3	Fish albumin	4.8	Fish manure	
	4.4	Isinglass	4.9	Pearl essence	
	4.5	Protein hydrolysate	4.10	Fish silage	

Periods: 30	**No. of Credits: 02**	**Marks: 50**

Major Course (Practical)

SFISCP1251: Practical based on SFISCT1251 (Fish Spoilage, Preservation and Quality Issues)

Module	**Unit**	**Title of topic**	**hrs**
1	1	Identification of fresh and spoiled fishes	60
	2	Assessment of fish spoilage by organoleptic method	
	3	Fish processing of locally available fish	
	4	Fish preservation by ice method	
	5	Fish preservation by drying	
	6	Fish preservation by salting	
	7	Fish preservation by freezing	
	8	Isolation of microorganisms by streak plate method	
	9	Gram staining and identification of microorganisms.	
	10	Microbial analysis of fish products (Enumeration: Total plate count)	
	11	Determination of TVB-N	
	12	Determination of fish quality by using Hedonic scale method	
	13	Visit to fish processing industry and submission of report.	

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Faculty of Science and Technology

B. Sc. Second Year (NEP 2020)

Effective from June 2025 Semester- IV

Subject: Fishery Science

Major Course (Practical)

SFISCP1251 practical based on SFISCT1251

(Fish Spoilage, Preservation and Quality Issues)

Centre:

Date: **Time:** **Batch No.:**

Credits: 02 **Marks: 30**

Q. 1 Perform gram staining of given slide/culture and comment. 10

OR

Isolate microorganisms by streak plate method.

Q. 2 Preserve given fish using appropriate method. 08

Q. 3 Determine the quality of given fish specimen using appropriate method (Hedonic scale, organoleptic evaluation, TVB-N) 08

Q. 4 Submission of model/Viva-voce 04

Periods: 30 **No. of Credits: 02** **Marks: 50**

Major Course (Practical)

SFISCP1252: Practical based on SFISCT1252 (Fish Products and Byproducts Technology)

Module	Unit	Title of topic	hrs
1	1	Estimation of protein from fish products	60
	2	Estimation of fat from fish products	
	3	Preparation of fish meal from locally available fish	
	4	Extraction of fish oil from locally available fish	
	5	Preparation of fish floor	
	6	Preparation of fish manure	
	7	Extraction of chitin from prawn shell	
	8	Extraction of gelatin from fish scales	
	9	Study of fish byproducts: i) Fish oil ii) Fish silage iii) Fish glue iv) Pearl essence v) Fish liver oil vi) Fish meal vii) Fish manure viii) Fish floor	
	10	Visit to fish byproduct industry and submission of report	

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Subject: Fishery Science

Major Course (Practical)

SFISCP1252 practical based on SFISCT1252

(Fish Products and Byproducts Technology)

Centre:

Date: **Time:** **Batch No.:**

Credits: 02 **Marks: 30**

Q. 1	Estimate …… from given sample. (Protein/ Fat)	10
Q. 2	Prepare fish manure/fish floor from given fish specimen.	08
Q. 3	Extract ……. From given fish specimen (Chitin/Gelatin/Fish oil)	08
Q. 4	Submission of model/Viva-voce	04

Periods: 30 **No. of Credits: 02** **Marks: 50**

Minor Course (Theory)

SFISMT1251: Preparation of Value Added Products

Module	Unit	Title of topic	hrs
1		**Unit-I:**	08
	1.1	Fish cutlets	
	1.2	Fish fingers	
	1.3	Fish balls	
	1.4	Fish pickles	
2		**Unit-II: Other value added products**	08
	2.1	Fish wafers	
	2.2	Fish soup powder	
	2.3	Fish noodles	
	2.4	Fish burgers	
	2.5	Fish protein concentrate	
	2.6	Fish sausages	
3		**Unit-III: Packing material and criteria of selection**	07
	3.1	Packing materials	
	3.2	Criteria of selection	
4		**Unit-IV: Packing system**	07
	4.1	Vacuum packing (VP)	
	4.2	Modified atmospheric air packing (MAP)	
	4.3	Controlled atmospheric packing (CAP)	

Periods: 30 **No. of Credits: 02** **Marks: 50**

Minor Course (Practical)

SFISMP1251: Practical based on SFISMT1251 (Preparation of Value Added Products)

Module	Unit	Title of topic	hrs
1	1	Preparation of fish cutlets	60
	2	Preparation of fish fingers	
	3	Preparation of fish balls	
	4	Preparation of fish pickles	
	5	Study of packing material	
	6	Study of value added products: i) fish wafers ii) fish soup powder iii) fish noodles iv) fish burgers v) fish protein concentrate vi) fish sausages	
	7	Demonstration of vacuum packing.	
	8	Demonstration of MAP	
	9	Demonstration of CAP	
	10	Demonstration of Packing machine	
	11	Demonstration of Sealing machine	
	12	Demonstration of Labelling	
	13	Visit to value added fish product byproduct company and submission of report	

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Effective from June 2025 Semester- IV

Subject: Fishery Science

Minor Course (Practical)

SFISMP1251 practical based on SFISMT1251

(Preparation of Value Added Products)

Centre:

Date: **Time:** **Batch No.:**

Credits: 02 **Marks: 30**

Q. 1	Prepare fish cutlet / fish finger/ fish balls/ fish pickles.	08
Q. 2	Prepare /Explain steps in preparation of ……... (Fish wafers, noodles, burger, sausages, soup powder)	08
Q. 3	Preparation of packaging and sealing of product in given packaging material.	06
Q. 4	Identify and comment on spot (Packaging material, Packaging machine)	04
Q. 5	Submission of model/Viva-voce	04

Periods: 30 **No. of Credits: 02** **Marks: 50**

Generic Elective (Theory)

SFISGE1251: Fabrication and Maintenance of Aquarium

Module	Unit	Title of topic	hrs
1		**Unit-I: Fabrication of aquarium**	08
	1.1	Types of aquarium	
	1.2	Material used for fabrication	
	1.3	Fabrication of aquarium tank	
	1.4	Equipments used : Filter, aerator, heater	
2		**Unit-II: Setting of aquarium**	
	2.1	Decoration of tank	
	2.2	Aquarium fishes	
	2.3	Aquarium plants	
	2.4	Aquarium toys	
	2.5	Setting of air pump and filters	
	2.6	Water supply	
3		**Unit-III: Maintenance of aquarium**	
	3.1	Types of food and feeding	
	3.2	Monitoring water quality	
	3.3	Oxygen level	
	3.4	Light	
	3.5	Temperature	
4		**Unit-IV: Disease management**	
	4.1	Common fish disease	
	4.2	Symptoms and prevention of disease	
	4.3	Disease treatment	
	4.4	Quarantine and isolation	

Periods: 30 **No. of Credits: 02** **Marks: 50**

Skill Based Course (Practical)

SFISVSC1251: Fabrication and Maintenance of Aquarium

Module	Unit	Title of topic	hrs
1	1	Equipment of aquarium	60
	2	Aquarium fishes	
	3	Aquarium toys	
	4	Aquarium plants	
	5	Air pumps and filters	
	6	Types of food	
	7	Fabrication of aquarium	
	8	Setting of aquarium	
	9	Decoration of aquarium	
	10	Maintenance of water quality	
	11	Common fish disease	
	12	Treatment of fish disease	

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