



॥ 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

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विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत
राष्ट्रीय शैक्षणिक धोरण-२०२० नुसार
पदवी तृतीय वर्षाचे अभ्यासक्रम
(Syllabus) शैक्षणिक वर्ष २०२६-२७
पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, दिनांक २२ एप्रिल २०२६ रोजी संपन्न झालेल्या मा.विद्यापरिषद बैठकीतील विषय क्र.०८/६४-२०२६ च्या ठरावानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील राष्ट्रीय शैक्षणिक धोरण-२०२० नुसार पदवी तृतीय वर्षाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२६-२७ पासून लागू करण्यास मा.विद्यापरिषदेने मान्यता प्रदान केली आहे. त्यानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील बी.एस्सी. तृतीय वर्षाचे खालील विषयाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२६-२७ पासून लागू करण्यात येत आहे.

01	B.Sc. III Year Physics
02	B.Sc. III Year Geography
03	B.Sc. III Year Fishery Science
04	B.Sc. III Year Dyes & Drugs

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/परिपत्रक/पदवी/बीएस्सी/२०२६-२७/१६

दिनांक : १४.०७.२०२६

उपकुलसचिव
शैक्षणिक (१-अभ्यासमंडळे) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :-

- १) मा. कुलगुरू महोदयांचे कार्यालय, प्रस्तुत विद्यापीठ.
- २) मा. प्र.कुलगुरू महोदयांचे कार्यालय, प्रस्तुत विद्यापीठ
- ३) मा. अधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
- ४) मा. संचालक, परिक्षा व मुल्यापेक्षा मंडळ, प्रस्तुत विद्यापीठ.
- ५) मा. प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
- ६) सिस्टीम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. यांना 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**

SUB – FISHERY SCIENCE

Major in DSC and Minor in DSM (Subject)

Syllabus

B.Sc. Third Year

Under the Faculty of Science & Technology

**Effective from the Academic year 2026-27
(As per NEP-2020)**



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. K. S. Shillewar Department of Fishery Science Science College, Nanded	Chairman
02.	Dr. Seema Shesherao Korde, Department of Fishery Science Azad Mahavidyalaya, Ausa, Dist. Latur.	Member
03.	Dr. Shivaji Prabhakar Chavan School of Life Sciences, SRTM University Nanded	Member
04.	Dr. Dhanaji Waman Patil Department of Fishery Science, Toshniwal Arts Commerce and Science College, Sengaon, Dist. Hingoli	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. N. G Popatwar Department of Fishery Science, DSM College, Jintur, Dist: Parbhani	Invitee Member
09.	Dr. Sandip Surendra Markad Department of Fishery Science Toshniwal Arts Commerce and Science College, Sengaon, Dist. Hingoli	Invitee Member



Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science & Technology

Subject: Fishery Science

B.Sc. Third Year Semester V (Level 5.5)

Teaching Scheme

Subject	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs/ week)	
			Theory	Practical	Total	Theory	Practical
Major (Theory)	SFISCT1301	Indian Capture Fisheries	03	--	03	03	--
	SFISCT1302	Aquaculture	03	--	03	03	--
	SFISIK1303	History of Pisciculture	02	--	02	02	--
Major (Practical)	SFISCP1301	Practical based on SFISCT1301	--	02	02	--	04
	SFISCP1302	Practical based on SFISCT1302	--	02	02	--	04
Elective (Theory) (Select any one Theory paper for A or B)	SFISCT1301	A. Shellfish Farming	02	--	02	02	--
		B. Management of Soil and Water Quality in Aquaculture					
Elective (Practical) (Based on Elective Theory paper A or B)	SFISEP1301	A. Practical based on SFISET1301 (A)	--	02	02	--	04
		B. Practical based on SFISET1301 (B)					
Vocational Course (Select any one Course from A or B)	SFISVC1301	A. Fish Feed Manufacture	--	02	02	--	04
		B. Culture of Fish Food Organisms					
Field Project	SFISFP1301	Field project	--	04	04	--	08
Total Credits			10	12	22	10	24



Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science & Technology

Subject: Fishery Science

B.Sc. Third Year Semester V (Level 5.5)

Examination Scheme

Subject	Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
			Continuous Assessment (CA)			ESA			
			Test 1	Test 2	Avg of T1 & T2	Total	CA	ESA	
01	02	03	04	05	06	07	08	09	10
Major (Theory)	SFISCT1301	Indian Capture Fisheries	30	30	30	45	--	--	75
	SFISCT1302	Aquaculture	30	30	30	45	--	--	75
	SFISIK1303	History of Pisciculture	20	20	20	30	--	--	50
Major (Practical)	SFISCP1301	Practical based on SFISCT1301	--	--	--	--	20	30	50
	SFISCP1302	Practical based on SFISCT1302	--	--	--	--	20	30	50
Elective (Theory) (Select any one Theory paper from A or B)	SFISSET1301	A. Shellfish Farming	20	20	20	30	--	--	50
		B. Management of Soil and Water Quality in Aquaculture							
Elective (Practical) (Based on Elective Theory paper A or B)	SFISEP1301	A. Practical based on SFISSET1301 (A)	--	--	--	--	20	30	50
		B. Practical based on SFISSET1301 (B)							
Vocational Course (Select any one Course from A or B)	SFISVC1301	A. Fish Feed Manufacture	--	--	--	--	20	30	50
		B. Culture of Fish Food Organisms							
Field Project	SFISFP1301	Field project	--	--	--	--	40	60	100

[Continuous Assessment (CA): 40% and End Semester Assessment (ESA): 60%]



Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science & Technology

Subject: Fishery Science

B.Sc. Third Year Semester VI (Level 5.5)

Teaching Scheme

Subject	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs/ week)	
			Theory	Practical	Total	Theory	Practical
Major (Theory)	SFISCT1351	Aquarium and Ornamental Fish Management	03	--	03	03	--
	SFISCT1352	Anatomy and Physiology of Fishes	03	--	03	03	--
	SFISCT1353	Developmental Biology of Fishes	02	--	02	02	--
Major (Practical)	SFISCP1351	Practical based on SFISCT1351	--	02	02	--	04
	SFISCP1352	Practical based on SFISCT1352	--	02	02	--	04
Elective (Theory) (Select any one Theory paper for A or B)	SFISCT1351	A. Fishing Gear and Craft Technology	02	--	02	02	--
		B. Fish Nutrition and Feed Manufacturing Technology					
Elective (Practical) (Based on Elective Theory paper A or B)	SFISEP1351	A. Practical based on SFISET1351 (A)	--	02	02	--	04
		B. Practical based on SFISET1351 (B)					
Vocational Course (Select any one Course from A or B)	SFISVC1351	A. Breeding of Aquarium Fishes and Plants	--	02	02	--	04
		B. Manufacture of Fishing Nets					
On Job Training	SFISOJ1351	On Job Training	--	04	04	--	08
Total Credits			10	12	22	10	24



Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science & Technology

Subject: Fishery Science

B.Sc. Third Year Semester VI (Level 5.5)

Examination Scheme

Subject	Course Code	Course Name	Theory				Practical		Total Col (6+7) / Col (8+9)
			Continuous Assessment (CA)			ESA			
			Test 1	Test 2	Avg of T1 & T2	Total	CA	ESA	
01	02	03	04	05	06	07	08	09	10
Major (Theory)	SFISCT1351	Aquarium and Ornamental Fish Management	30	30	30	45	--	--	75
	SFISCT1352	Anatomy and Physiology of Fishes	30	30	30	45	--	--	75
	SFISCT1353	Developmental Biology of Fishes	20	20	20	30	--	--	50
Major (Practical)	SFISCP1351	Practical based on SFISCT1351	--	--	--	--	20	30	50
	SFISCP1352	Practical based on SFISCT1352	--	--	--	--	20	30	50
Elective (Theory) (Select any one Theory paper from A or B)	SFISCT1351	A. Fishing Gear and Craft Technology	20	20	20	30	--	--	50
		B. Fish Nutrition and Feed Manufacturing Technology							
Elective (Practical) (Based on Elective Theory paper A or B)	SFISEP1351	A. Practical based on SFISET1351 (A)	--	--	--	--	20	30	50
		B. Practical based on SFISET1351 (B)							
Vocational Course (Select any one Course from A or B)	SFISVC1351	A. Breeding of Aquarium Fishes and Plants	--	--	--	--	20	30	50
		B. Manufacture of Fishing Nets							
On Job Training	SFISOJ1351	On Job Training	--	--	--	--	40	60	100

[Continuous Assessment (CA): 40% and End Semester Assessment (ESA): 60%]



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,

Four Year UG Program, Fishery Science (w.e.f. June-2026)

B.Sc. Third Year Semester-V

SYLLABUS

Periods: 45

No. of Credits: 03

Marks: 75

Major Course (Theory)

SFISCT1301: Indian Capture Fisheries

Course objectives:

1. To introduce the major fishery resources of India and their importance in fish production and the national economy.
2. To study the riverine fisheries of India with reference to major river systems and their fish resources.
3. To understand the fisheries of reservoirs and other important inland water bodies of India.
4. To study the fishery resources of estuaries, brackishwater lakes and other brackishwater environments.
5. To understand the marine fishery resources of India, commercially important species, fishing crafts and gears.

Course outcomes:

After successful completion of this course, students will be able to:

1. Describe the major fishery resources of India and their contribution to fish production and the national economy.
2. Explain the fisheries of major river systems and identify important riverine fish resources.
3. Describe the fisheries of major reservoirs and other inland water bodies of India.
4. Explain the fishery resources of major estuaries and brackishwater lakes.
5. Describe the marine fishery resources of India, commercially important species, and commonly used fishing crafts and gears.

Content

Module	Unit	Title of topic	hrs
1		Unit-I: Indian Fisheries	10
	1.1	Introduction to Indian Fisheries	
	1.2	Classification of Fisheries in India: Inland, Marine, Brackishwater	
	1.3	Fisheries Resources of India: Inland, Marine, Brackish water	
	1.4	Present Status of Fish Production in India	
	1.5	Importance of Fisheries in National Economy	
	1.6	Fishing Crafts and Gears	
2		Unit-II: Riverine fisheries of India	11
	2.1	Introduction to Inland Fisheries: Riverine, reservoir, lakes, ponds, wetlands	
		Riverine Fisheries	
	2.2	Classification of rivers of India	
	2.3	Major River Systems in India: A) Ganga River System B) Brahmaputra River System C) East Coast River System D) West Coast River System E) Indus River System	
	2.4	Types of riverine fishes: Resident, Local migrants, Long distant migrants	
3		Unit-III: Reservoir and brackish water Fisheries of India	13
	3.1	Types of reservoirs: Small, Medium, Large	
	3.2	Major fish species of reservoirs	
	3.3	Fisheries of Major reservoirs of India: Gandhisagar Reservoir, Gobindsagar	

		/ Bhakra Nangal, Nathsagar	
	3.4	Differences between lakes and reservoirs	
	3.5	Classification of estuarine fish species: Oligohaline, True estuarine, Euryhaline marine, Stenohaline marine, Migrants	
	3.6	Fisheries Major estuaries: Hoogly – Matlah, Godavari Estuary	
	3.7	Fisheries of Chilka lake and Pulicat lake,	
4		Unit-IV: Marine Fisheries	11
	4.1	Introduction to Marine Fisheries	
	4.2	Structure of the marine environment: Intertidal zone, Littoral zone ,Supra littoral zone, Sublittoral zone, Continental shelf, Continental slope, Continental rise, Abyssal plain	
	4.3	Zones: Pelagic zone, Benthic zone, Demersal zone.	
	4.4	Exclusive Economic Zone (EEZ)	
	4.5	Fisheries of Commercially Important Marine species	
		a. Fishes: Sardines, Mackerels, Pomfrets, Bombay Duck	
		b. Shellfishes: Tiger Shrimps, Crabs, Molluscs	

References:

1. Jhingran, V. G. (1991). *Fish and Fisheries of India*. 3rd Ed. Hindustan Publishing Corporation, New Delhi.
2. Bal, D. V. and Rao, K. V. (1990). *Marine Fisheries of India*. Tata McGraw-Hill, New Delhi.
3. Sugunan, V. V. (1995). *Reservoir Fisheries of India*. FAO Fisheries Technical Paper No. 345, FAO, Rome.
4. Srivastava, C. B. L. *A Text Book of Fishery Science and Indian Fisheries*. Kitab Mahal, Allahabad.
5. Chinte, D. N., Kasab, D. R., Wagh, D. C. and Jetithor, S. G. *A Text Book of Indian Fisheries and Mariculture*. Kuldev Publication, Chhatrapati Sambhajinagar.
6. Gabriel, O., Lange, K., Dahm, E. and Wendt, T. (2005). *Von Brandt's Fish Catching Methods of the World*. 4th Ed. Blackwell Publishing, Oxford.
7. ICAR (2006). *Handbook of Fisheries and Aquaculture*. Indian Council of Agricultural Research, New Delhi.
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9. Samuel, C. T. (1968). *Marine Fisheries in India*. Narendra Publishing House, New Delhi.
10. Blaber, S. J. M. (1997). *Fish and Fisheries of Tropical Estuaries*. Chapman & Hall, London.
11. Pandey, K. and Shukla, J. P. *Fish and Fisheries*. Rastogi Publications, Meerut.
12. Sharma, V. and Grover, S. P. *An Introduction to Indian Fisheries*. Bishen Singh Mahendra Pal Singh, Dehradun.
13. Biswas, K. P. *A Text Book of Fish, Fisheries and Technology*. Narendra Publishing House, New Delhi.
14. Markad, Sandip (Ed.) (2024). *The Biology, Management, Aquaculture and Fisheries of Lobsters*. Delve Publishing, Canada. 226 p. ISBN: 978-1-77469-839-6.
15. Patil, Dhanaji and Sandip Markad (Eds.) (2026). *Sustainable Aquaculture: Recent Advances and Techniques*. Apple Academic Press Inc., Florida, USA. 412 p.



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,

Four Year UG Program, Fishery Science (w.e.f. June-2026)

B.Sc. Third Year Semester-V

SYLLABUS

Periods: 45

No. of Credits: 03

Marks: 75

Major Course (Theory)

SFISCT1302: Aquaculture

Course objectives:

1. To introduce the basic concepts, scope, importance and different systems of aquaculture.
2. To understand the importance of water quality, pond management and control of unwanted fishes and aquatic weeds in aquaculture.
3. To study the culture practices of commercially important freshwater, brackishwater and marine fishes.
4. To understand the role of probiotics and other management practices in improving aquaculture production.
5. To introduce modern aquaculture systems such as aquaponics, biofloc technology and recirculating aquaculture systems.

Course outcomes:

After successful completion of this course, students will be able to:

1. Explain the basic principles, types and systems of aquaculture and integrated fish farming.
2. Assess important water quality parameters and describe the management of unwanted fishes, aquatic weeds and pond productivity.
3. Describe culture practices of Indian Major Carps, Exotic Carps, Magur, Milkfish and seabass.
4. Explain the use and significance of probiotics in aquaculture.
5. Describe the principles and applications of aquaponics, biofloc technology, recirculating aquaculture systems and sewage-fed fish culture.

Content

Module	Unit	Title of topic	hrs
1		Unit-I: Introduction	10
	1.1	Introduction, Definition, Scope and importance of aquaculture	
	1.2	Concepts of. Extensive aquaculture, intensive aquaculture, Semi-intensive	
	1.3	Types of Aquaculture: Based on Number of Speice: i) Monoculture ii) Polyculture Based on Type of water: Freshwater, Brackish water, Marine water	
	1.4	Integrated fish farming: Principle and concept	
	1.5	Man Made Hazards and Aquaculture: i) Domestic Sewage ii) Agricultural Sewage iii) Industrial Effluents	
2		Unit-II:	11
	2.1	Characteristics of Water for aquaculture i) Physical ii) Chemical iii) Biological	
	2.2	Control of predatory and weed fishes i) Characteristics of predatory and weed Fishes. ii) Predatory and weed Fishes in India iii) Control of predatory and weed fishes	
	2.3	Aquatic weeds and their control	

	2.4	i) Types of weeds ii) Advantages and Disadvantages of weeds iii) Weed Control - Manual, Mechanical, Chemical and Biological Application of Manures in Aquaculture	
3	3.1 3.2 3.3 3.4 3.5	Unit-III: Culture of Indian major carps Culture of Exotic Carp Culture of Magur Culture of milk fish Culture of sea bass.	13
4	4.1 4.2 4.3 4.4 4.5	Unit-IV: Probiotics in aquaculture: Introduction, Definition, Selection criteria, Composition and dosages., Potential of probiotics, Overall significance Aquaponics Biofloc culture Recirculating Aquaculture Systems (RAS) Sewage Fed Fish Culture	11

References:

- Pillay, T. V. R. and Kutty, M. N. (2005). *Aquaculture: Principles and Practices*. 2nd Ed. Blackwell Publishing.
- Bardach, J. E., Ryther, J. H. and McLarney, W. O. (1972). *Aquaculture: The Farming and Husbandry of Freshwater and Marine Organisms*. Wiley & Sons.
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- Jagtap, H. S., Mukherjee, S. N. and Garad, V. K. *A Text Book of Pisciculture and Aquarium Keeping*. Daya Publishing House, New Delhi.
- Saini, V. P., Surnar, S. R., Ojha, M. L., Ujjania, N. C. and Yadav, R. (2021). *Basics of Freshwater Aquaculture*. Himanshu Publications, New Delhi.
- Patil, Dhanaji and Sandip Markad (2024). गोड्या पाण्यातील मत्स्य संवर्धन आणि बिजोत्पादन (*Freshwater Fish Culture and Seed Production*). Notion Press, Inc. 184 p.
- Patil, Dhanaji and Sandip Markad (Eds.) (2026). *Sustainable Aquaculture: Recent Advances and Techniques*. Apple Academic Press Inc., Palm Bay, Florida, USA. 412 p.
- Chavan, S. P., Kadam, M. S. and Niture, S. D. *Aquaculture and Aquarium Keeping*. Educational Books and Publishers, Chhatrapati Sambhajanagar.
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Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,

Four Year UG Program, Fishery Science (w.e.f. June-2026)

B.Sc. Third Year Semester-V

SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Major Course (Theory)

SFISIK1303: History of Pisciculture

Course objectives:

1. To introduce the origin, history and development of pisciculture from ancient to modern times.
 2. To study traditional fish culture practices and the development of pisciculture in India.
 3. To understand major developments in fish breeding, hatchery technology and culture systems.
 4. To trace the growth of fisheries education, extension and the Blue Revolution in India.
- To understand global trends, sustainable practices, challenges and future prospects of pisciculture.

Course outcomes:

After successful completion of this course, students will be able to:

1. Describe the origin and historical development of pisciculture in different civilizations.
2. Explain the development of pisciculture in India, including indigenous practices.
3. Discuss major technological developments in fish breeding, hatcheries and modern culture systems.
4. Explain the role of the Blue Revolution, fisheries education and extension in the development of Indian fisheries.
5. Discuss global trends, sustainability, climate change and future challenges in pisciculture.

Content

Module	Unit	Title of topic	hrs
1		Unit-I: Introduction and Early History of Pisciculture	7
	1.1	Definition and scope of pisciculture	
	1.2	Origin and evolution of fish culture in ancient civilizations	
	1.3	Early fish culture practices in: China, Egypt, Rome, India	
	1.4	Traditional fish farming systems	
	1.5	Importance of pisciculture in human civilization	
2		Unit-II: Development of Pisciculture in India	8
	2.1	Historical development of fisheries in India	
	2.2	Indigenous fish culture practices	
	2.3	Development of carp culture in India	
	2.4	Blue Revolution in India	
	2.5	Fisheries education and extension programs	
3		Unit-III: Modern Pisciculture and Technological Advancements	8
	3.1	Development of hatchery technologies	
	3.2	Induced breeding techniques	
	3.3	Composite fish culture system	
	3.4	Integrated fish farming	
	3.5	Development of ornamental fish culture	
4		Unit-IV: Global Trends and Future Prospects	7

4.1	Modern aquaculture systems in the world	
4.2	Sustainable fish farming practices	
4.3	Role of pisciculture in food security and economy	
4.4	Export and trade of fish products	
4.5	Climate change and its impact on fisheries	
4.6	Future scope and challenges of pisciculture	

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Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science and Technology,

Four Year UG Program, Fishery Science (w.e.f. June-2026)

B.Sc. Third Year Semester-V

SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Major Course (Practical)

SFISCP1301: Practical based on SFISCT1301: Indian Capture Fisheries

Course objectives:

1. To develop practical skills in the identification of commercially important freshwater, marine and brackishwater fishery resources.
2. To familiarize students with the major fishery resources and fish production trends of India.
3. To develop skills in the preparation and interpretation of fish production graphs and river system maps.
4. To provide practical knowledge of commonly used fishing crafts and gears.
5. To provide field exposure to fisheries activities through visits to important fishery-related sites.

Course outcomes:

After successful completion of this course, students will be able to:

1. Identify commercially important freshwater, marine and brackishwater fishes and shellfishes.
2. Recognize and describe the major fishery resources of India.
3. Analyse fish production data and represent it graphically.
4. Prepare maps of major river systems and identify commonly used fishing crafts and gears.
5. Observe, document and report fishery activities through field visits, assignments,

Content

Module	Unit	Title of topic	hrs
1	1	Study of commercially important freshwater fishes: Catla, Rohu, Mrigal, Murrel, Magur, Common carp, Freshwater prawn	60
	2	Study of commercially important Marine fishes: Sardines, Mackerels, Pomfrets, Bombay Duck, Tiger Shrimps, Crabs, Molluscs	
	3	Study of commercially important brackish water fishes: Mullet, Asian sea bass, Milkfish, Hilsa	
	4	Study of fishery resources of India.	
	5	Study of Yearwise Indian fishery production (Inland, Marine, total) and its graphical representation.	
	6	Preparation of Map of river system: A) Ganga River System B) Brahmaputra River System	
	7	Study of fishing crafts	
	8	Study of fishing gears	
	9	Visit to reservoir, lake, estuary, Market, etc. for study of fishery activity.	
	10	Preparation and submission of assignment, model, chart, etc.	

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

B. Sc. Third Year (NEP 2020)

Effective from June 2026 Semester- V

Subject: Fishery Science

Major Course (Practical)

SFISCP1301 practical based on SFISCT1301

(Indian Capture Fisheries)

Centre:

Date:

Time:

Batch No.:

Credits: 02

Marks: 30

- Q. 1 Identify and comment on given finfishes 08
- a.
- b.
- c.
- d.
- Q. 2 Identify and comment on given Shellfishes 04
- a.
- b.
- Q. 3 Identify and Comments on fishing crafts and gears (One each) 04
- a.
- b.
- Q. 4 Draw river path of on provided map of India. 04
(Ganga River System/ Brahmaputra River System)
- OR**
- Plot a graph of given Indian fishery production data.
- Q. 5 Viva-voce 05
- Q. 6 Student Performance during semester 03
- Q. 7 Journal / Record book 02

Examiner 1

Examiner 2



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,

Four Year UG Program, Fishery Science (w.e.f. June-2026)

B.Sc. Third Year Semester-V

SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Major Course (Practical)

SFISCP1302: Practical based on SFISCT1302: Aquaculture

Course objectives:

1. To develop practical skills in the identification of commercially important cultivable fishes and different stages of fish seed.
2. To familiarize students with predatory fishes, weed fishes, plankton and aquatic weeds commonly encountered in aquaculture.
3. To develop basic skills in the analysis of important water quality parameters.
4. To provide practical knowledge of fish feeds, manures, probiotics and their role in aquaculture.
5. To familiarize students with commonly used aquaculture equipment and their applications.

Course outcomes:

After successful completion of this course, students will be able to:

1. Identify commercially important cultivable fishes and different stages of fish seed.
2. Identify common predatory fishes, weed fishes, plankton and aquatic weeds relevant to aquaculture.
3. Analyse important water quality parameters such as dissolved oxygen, carbon dioxide, pH and hardness.
4. Identify fish feed ingredients, organic and inorganic manures, and important microorganisms used as probiotics.
5. Recognize and explain the use of common aquaculture equipment such as aerators, filters and pumps.

Content

Module	Unit	Title of topic	hrs
1	1	Study of commercially important cultivable fishes: IMC, Magur, Milk fish, Asian Sea bass, Freshwater Prawn	60
	2	Study of spawn, fry, Semi-fingerlings and fingerlings of Indian major carps	
	3	Study of predatory and weed fishes (03 each)	
	4	Analysis of water for DO, CO ₂ , pH, Hardness	
	5	Study of phytoplankton and zooplanktons (3 each)	
	6	Study of fish feed and its ingredients	
	7	Study of aquatic weeds	
	8	Study of different types of organic and inorganic manures.	
	9	Study of species used in probiotics (<i>Bacillus</i> , <i>Lactobacillus plantarum</i> , <i>Saccharomyces cerevisiae</i> , <i>Bacillus licheniformis</i> , <i>Nitrosomonas</i> species)	
	10	Equipments used in aquaculture: Aerator, Filter, Pumps	
	11	Preparation and submission of assignment, model, chart, etc.	

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Faculty of Science and Technology
B. Sc. Third Year (NEP 2020)
Effective from June 2026 Semester- V
Subject: Fishery Science
Major Course (Practical)
SFISCP1302: Practical based on SFISCT1302
(Aquaculture)

Centre:

Date:

Time:

Batch No.:

Credits: 02

Marks: 30

-
- | | | |
|------|---|----|
| Q. 1 | Analyse give water sample for estimation of
(Dissolved Oxygen/ Free Carbon Dioxide) | 06 |
| Q. 2 | Identify and comment on given specimen
(One each from Cultivable finfish, Shellfish, Predatory / Weed fish, Fish seed)
a.
b.
c.
d. | 08 |
| Q. 3 | Identify and comment on given specimen
(One each from Plankton, Aquatic Weed, Fish feed)
a.
b.
c. | 06 |
| Q. 4 | Viva-voce | 05 |
| Q.5 | Student Performance during semester | 03 |
| Q. 6 | Journal / Record book | 02 |

Examiner 1

Examiner 2



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,
Four Year UG Program, Fishery Science (w.e.f. June-2026)
B.Sc. Third Year Semester-V
SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Major Elective Course (Theory)

SFISSET1301: A. Shellfish Farming

Course objectives:

1. To introduce the biology and culture practices of commercially important shellfish species.
2. To understand the seed production and culture techniques of freshwater prawn and tiger shrimp.
3. To study the biology, culture practices and fattening techniques of mud crabs.
4. To understand the biology of pearl oysters and the process of pearl formation.
5. To develop knowledge of pre-stocking, stocking and post-stocking management in shellfish farming.

Course outcomes:

After successful completion of this course, students will be able to:

1. Describe the biology and culture requirements of commercially important prawns, shrimps, crabs and pearl oysters.
2. Explain seed production and pond culture practices of freshwater prawn and tiger shrimp.
3. Describe the seed resources, culture practices and fattening techniques of mud crabs.
4. Explain the biology of pearl oysters, pearl formation and methods of pearl culture.
5. Apply the principles of pre-stocking, stocking and post-stocking management in shellfish farming.

Content

Module	Unit	Title of topic	hrs
1		Unit-I: Culture of giant freshwater prawn	08
	1.1	Introduction to giant Freshwater Prawn - <i>Macrobrachium rosenbergii</i>	
	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 (<i>Penaeus monodon</i>)	
	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	08
	3.1	Introduction to mud crabs (<i>Scylla serrata</i> , <i>Scylla tranquebarica</i>)	
	3.2	Biology of Mud 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 4.1 Introduction 4.2 Important pearl oyster species : <i>Pinctada maxima</i> , <i>P. fucata</i> and <i>P. margaritifera</i> 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	07

References:

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Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,

Four Year UG Program, Fishery Science (w.e.f. June-2026)

B.Sc. Third Year Semester-V

SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Major Elective Course (Theory)

SFISSET1301: B. Management of Soil and Water Quality in Aquaculture

Course objectives:

1. To understand the basic properties and composition of water and their importance in aquaculture.
2. To study the water quality requirements and methods of water quality management in aquaculture systems.
3. To understand the principles and applications of aeration and filtration systems in maintaining water quality.
4. To study the physical, chemical and biological properties of soil relevant to aquaculture.
5. To understand the methods of soil quality assessment and the use of soil and water amendments in aquaculture.

Course outcomes:

After successful completion of this course, students will be able to:

1. Describe the physical, chemical and biological properties of soil and water important for aquaculture.
2. Assess the basic soil and water quality requirements for successful aquaculture.
3. Explain the collection and preparation of soil and water samples for quality assessment.
4. Describe the role of aerators and filtration systems in maintaining suitable water quality.
5. Explain the use of lime, manures, fertilizers and other amendments for soil and water quality management in aquaculture.

Content

Module	Unit	Title of topic	hrs
1		Unit-I: Introduction and properties of Water	07
	1.1	Soil and water resources for aquaculture	
	1.2	Chemistry of water: The water molecule, properties of pure water, fresh water and sea water.	
	1.3	Composition of waters: surface water, ground water and sea water.	
	1.4	Properties of water: Physical, Chemical and Biological	
2		Unit-II: Water Quality Management	08
	2.1	Water quality criteria/ requirements for Aquaculture.	
	2.2	Collection and preservation of water samples.	
	2.3	Aerators and Aeration system: a. Types of aerators (Diffused type, Air lift type, U-tube type, Splasher etc.) b. Role of aerators in the water quality management,	
	2.4	Filters and Filtration system: a. Types of filter (Mechanical filter, Biological and Air lift filter), b. Role of filters in the water quality management	

	2.5	Water quality maintenance in farming	
3		Unit-III: Introduction and properties of Soil	
	3.1	Soil Chemistry: origin and nature of soils.	07
	3.2	Properties of soil: Physical, Chemical and Biological(soil colour, texture, structure, pore size, bulk density, water holding capacity, Cation Exchange Capacity, pH, Organic carbon, Carbon - Nitrogen ratio, soil fertility, Microbes etc.)	
	3.3	Types of Soil	
	3.4	Distribution of Soil	
4		Unit-IV: Soil Quality Management	08
	4.1	Soil quality criteria/ requirements for aquaculture.	
	4.2	Collection and preparation of soil samples.	
	4.3	Soil and water amendments: lime, manures, fertilizers, micronutrients, zeolites, alum, gypsum	
	4.4	Environmental ameliorative: chlorination, deodorizers, bacterial formulation.	

References:

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2. Boyd, C. E. and Tucker, C. S. (1998). *Pond Aquaculture Water Quality Management*. Springer, Boston.
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14. Patil, Dhanaji and Sandip Markad (Eds.) (2026). *Sustainable Aquaculture: Recent Advances and Techniques*. Apple Academic Press Inc., Palm Bay, Florida, USA. 412 p.
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Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,

Four Year UG Program, Fishery Science (w.e.f. June-2026)

B.Sc. Third Year Semester-V

SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Major Elective Course (Practical)

SFISEP1301: A. Practical based on SFISSET1301 (A. Shellfish Farming)

Course objectives:

1. To develop practical skills in the identification and morphological study of commercially important shellfishes.
2. To study morphometric characters and sexual dimorphism in prawns, shrimps, crabs and pearl oysters.
3. To understand the internal anatomy and major organ systems of commercially important shellfishes through dissection.
4. To study the life cycles, developmental stages and important culture-related practices of shellfishes.
5. To provide practical knowledge of mud crab fattening, eyestalk ablation and pearl culture techniques.

Course outcomes:

After successful completion of this course, students will be able to:

1. Identify commercially important shellfishes and study their morphological and morphometric characters.
2. Differentiate male and female shellfishes based on external sexual characters.
3. Demonstrate the major internal organ systems of prawns, shrimps, crabs and pearl oysters.
4. Describe the life cycles and identify important life stages of commercially important shellfishes.
5. Explain and demonstrate basic techniques related to mud crab fattening, eyestalk ablation, pearl formation and pearl implantation.

Content

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. Third Year (NEP 2020)
Effective from June 2026 Semester- V
Subject: Fishery Science
Major Elective Course (Practical)
SFISEP1301: A. Practical based on SFISSET1301 (A. Shellfish Farming)

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) 08
- Q. 2 Estimate morphometric parameters of given shellfish specimens 06
- OR**
- Carry out eyestalk ablation of shrimp/ Implant given graft for pearl culture.
- Q. 3 Identify and comment on given spots (Any Three from Shellfish species, Life stages, sexual dimorphism,) 06
- a.....
- b.....
- c.....
- Q. 4 Viva-voce 05
- Q.5 Student Performance during semester 03
- Q. 6 Journal / Record book 02

Examiner 1

Examiner 2



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,
Four Year UG Program, Fishery Science (w.e.f. June-2026)
B.Sc. Third Year Semester-V
SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Major Elective Course (Practical)

SFISEP1301: B. Practical based on SFISSET1301

(B. Management of Soil and Water Quality in Aquaculture)

Course objectives:

1. To develop practical skills in the collection, preservation and handling of soil and water samples.
2. To train students in the analysis of important water quality parameters relevant to aquaculture.
3. To develop practical skills in the analysis of important physical and chemical properties of soil.
4. To understand the significance of soil and water quality parameters in aquaculture management.
5. To develop the ability to assess pond soil conditions and determine lime requirements for aquaculture ponds.

Course outcomes:

After successful completion of this course, students will be able to:

1. Collect, preserve and handle soil and water samples using appropriate procedures.
2. Estimate important water quality parameters such as dissolved oxygen, free carbon dioxide, pH, alkalinity, hardness and transparency.
3. Determine important soil properties such as water retention capacity, texture, pH and electrical conductivity.
4. Interpret basic soil and water quality parameters in relation to their suitability for aquaculture.
5. Estimate the lime requirement of aquaculture ponds based on soil conditions.

Content

Module	Unit	Title of Practical	hrs
1	1	Collection and storage of water and soil samples.	60
		Water analysis	
	2	Estimation of dissolved oxygen.	
	3	Estimation of free carbon dioxide	
	4	Estimation of pH,	
	5	Estimation of total alkalinity	
	6	Estimation of hardness,	
	7	Estimation of transparency	

		Soil analysis	
	8	Estimation of water retention capacity	
	9	Estimation of soil texture,	
	10	Estimation of pH,	
	11	Estimation of conductivity	
	12	Estimation of pond lime requirement (pond liming).	

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Faculty of Science and Technology
B. Sc. Third Year (NEP 2020)
Effective from June 2026 Semester- V
Subject: Fishery Science
Major Elective Course (Practical)
SFISEP1301: B. Practical based on SFISSET1301
(B. Management of Soil and Water Quality in Aquaculture)

Centre:

Date:

Time:

Batch No.:

Credits: 02

Marks: 30

- Q. 1 Analyse given water sample for estimation of 07
(Dissolved oxygen/ Free CO₂/pH/ Total alkalinity/ Hardness/ Transparency)
- Q. 2 Analyse given soil sample for estimation of 07
(water retention capacity / Soil Texture/ pH/ conductivity)
- Q. 3 Identify and comment on given spots (Any three) 06
a.....
b.....
c.....
- Q. 4 Viva-voce 05
- Q.5 Student Performance during semester 03
- Q. 6 Journal / Record book 02

Examiner 1

Examiner 2



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,
Four Year UG Program, Fishery Science (w.e.f. June-2026)
B.Sc. Third Year Semester-V
SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Vocational Course (Practical)

SFISVC1301: A. Fish Feed Manufacture

Course objectives:

1. To understand the importance of feed and the basic nutritional requirements of fishes.
2. To familiarize students with different types of fish feeds and factors affecting feed design and feeding.
3. To develop knowledge of feed ingredients, additives and their selection for fish feed preparation.
4. To develop practical understanding of fish feed formulation using suitable methods.
5. To provide knowledge and skills in feed manufacturing, storage and quality control.

Course outcomes:

After successful completion of this course, students will be able to:

1. Explain the importance of feed and nutritional requirements of fishes.
2. Identify different types of fish feeds, feed ingredients and commonly used feed additives.
3. Select suitable ingredients and formulate fish feed using appropriate methods.
4. Describe and carry out the major steps involved in fish feed manufacturing.
5. Apply appropriate methods for storage and quality control of manufactured fish feed.

Content

Module	Unit	Title of topic	hrs
1	1	Introduction and importance of feed	60
	2	Nutritional requirement of fishes	
	3	Feed types (Wet feed, Moist, Dry, Larval)	
	4	Factors affecting feed design, production and feeding	
	5	Ingredients for fish feed (Animal origin & plant origin)	
	6	Feed Additives (Binders, antioxidants, antimicrobial agents, chemo attractants, feeding stimulants, Pigments, anabolic agents, miscellaneous)	
	7	Formulation of fish Feed: Pearson's square method, linear programming method	
	8	Selection of ingredients	
	9	Steps in fish Feed Manufacture (Premix processing, grinding, mixing, pelleting, extrusion cooking, cooling, drying, crumbling, fat spraying, bagging, storage, quality control)	
	10	Storage of fish feed	
	11	Quality control of feed	



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,

Four Year UG Program, Fishery Science (w.e.f. June-2026)

B.Sc. Third Year Semester-V

SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Vocational Course (Practical)

SFISVC1301: B. Culture of fish food Organisms

Course objectives:

1. To understand the importance of live food organisms in fish and shellfish culture.
2. To introduce the major groups of live food organisms used in aquaculture.
3. To develop practical knowledge of microalgae, infusoria and rotifer culture.
4. To develop skills in the culture of *Artemia*, *Moina* and *Daphnia* as live food.
5. To understand the culture methods of *Tubifex* worms and chironomids for use as fish food.

Course outcomes:

After successful completion of this course, students will be able to:

1. Explain the importance and role of live food organisms in aquaculture.
2. Identify commonly used live food organisms suitable for different stages of fish culture.
3. Culture microalgae, infusoria and rotifers using suitable methods.
4. Culture *Artemia* nauplii, *Moina* and *Daphnia* for use as live fish food.
5. Describe and apply suitable methods for the culture of *Tubifex* worms and chironomids.

Content

Module	Unit	Title of topic	hrs
1	1	Introduction:	60
	2	Importance of live food	
	3	Micro algae Culture	
	4	Infusoria Culture	
	5	Rotifer Culture	
	6	<i>Artemia</i> nauplii Culture	
	7	<i>Moina</i> Culture	
	8	<i>Daphnia</i> Culture	
	9	<i>Tubifex</i> worms Culture	
	10	Chironomids Culture	

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

B. Sc. Third Year (NEP 2020)

Effective from June 2026 Semester- V

Subject: Fishery Science

Vocational Course (Practical)

SFISVC1301: A. Fish Feed Manufacture OR B. Culture of fish food Organisms

Centre:

Date:

Time:

Batch No.:

Credits: 02

Marks: 30

Sr. No.	End Semester Assessment (ESA)	Maximum Marks	Marks Obtained
1	Vocational Course Report Submission/Assessment	10	
2	Overall Judgment of Performance During Course	10	
3	Course Work Presentation/ Viva-voce	10	
	Total Marks	30	

Examiner 1

Examiner 2



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,

Four Year UG Program, Fishery Science (w.e.f. June-2026)

B.Sc. Third Year Semester-V

SYLLABUS

Periods: 120	No. of Credits: 04	Marks: 100
SFISFP1301: Field Project		

Course objectives:

1. To provide students with practical exposure to field-based studies in Fishery Science.
2. To develop the ability to identify a problem and plan a suitable field project.
3. To train students in field data collection, observation, documentation and analysis.
4. To develop skills in scientific interpretation, report writing and drawing conclusions from field observations.
5. To improve independent learning, problem-solving and presentation skills through project work.

Course outcomes:

After successful completion of this course, students will be able to:

1. Identify and select a relevant field-based problem or topic in Fishery Science.
2. Plan and carry out a field project using appropriate methods and techniques.
3. Collect, organize and analyse field data systematically.
4. Interpret the results and draw meaningful conclusions from the project work.
5. Prepare a scientific project report and effectively present the findings of the study.

GUIDELINES

For successful completion of Field Project (SFISFP1301), student will choose topic relevant to Fishery Science as per their interest for field project under the guidance of concerned faculties. Student will design, plan and work on the selected topic of project under the guidance of concerned faculty. The students will prepare and submit type written detailed final project report based on the work, analysis, results, outcomes, conclusions, etc. and present his work during exam.

The final Project Report may be prepared with following chapter structure:

1. Introduction
2. Objectives
3. Materials and methods
4. Results and Discussion
5. Conclusion
6. Reference



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,

Four Year UG Program, Fishery Science (w.e.f. June-2026)

B.Sc. Third Year Semester-VI

SYLLABUS

Periods: 45

No. of Credits: 03

Marks: 75

Major Course (Theory)

SFISCT1351: Aquarium and Ornamental fish management

Course objectives:

1. To introduce the basic concepts, types, fabrication, setting and maintenance of aquariums.
2. To study important indigenous and exotic ornamental fishes and commonly used aquarium plants.
3. To understand the feeding, care and water quality management of aquarium fishes.
4. To study the breeding techniques and transportation of commercially important ornamental fishes.
5. To understand the common diseases of ornamental fishes and their treatment and control.

Course outcomes:

After successful completion of this course, students will be able to:

1. Fabricate, set up and maintain different types of aquariums using appropriate accessories.
2. Identify important indigenous and exotic ornamental fishes and commonly used aquarium plants.
3. Manage feeding, care and water quality requirements of aquarium fishes.
4. Explain the breeding techniques of important egg-laying and live-bearing ornamental fishes and their transportation.
5. Identify common diseases of ornamental fishes and describe their treatment and control measures.

Content

Module	Unit	Title of topic	hrs
1		Unit-I: Aquarium 1.1 Introduction and definition of Aquarium 1.2 Importance of aquarium 1.3 Types of aquarium 1.4 Aquarium fabrication 1.5 Accessories of aquarium 1.6 Setting of aquarium 1.7 Benefits of ornamental fish keeping.	11
2		Unit-II: Aquarium Fishes and Plants 2.1 Study of important ornamental fishes: (Taxonomy and general characters) a. Indigenous ornamental fishes: i) <i>Brachydanio rerio</i> (Zebra fish), ii) <i>Chanda nama</i> (Glass fish), iii) <i>Botia lohachata</i> (Reticulated loach), iv) <i>Notopterus notopterus</i> (black knife fish) b. Exotic ornamental fishes: i) <i>Carassius auratus</i> (Goldfish), ii) <i>Betta splendens</i> (Siamese fighting fish), iii) <i>Poecillia reticulata</i> (Guppy), iv) <i>Xiphophorus helleri</i> (Sword tail fish) 2.2 Study of important Aquarium plants a. Floating plants: <i>Lemna</i> , <i>Eicchornia</i> , <i>Azolla</i>	13

		b. Emergent plants: <i>Nymphaea</i> , <i>Amazon Sword</i> c. Submerged plants: <i>Hydrilla</i> , <i>Vallisneria</i> , <i>Ceratophyllum</i> , <i>Cabomba</i> d. Marginal plants: <i>Typha</i> , <i>Cyperus</i> , 2.3 Food for Aquarium fishes: fish feeds, and live fish food organism 2.4 Care and maintenance of aquarium	
3	3.1 Identification of male and female brooders 3.2 Breeding technique of ornamental fishes Egg layers: i) Siamese fighting fish, ii) Gold fish, iii) Gourami Live Bearers: i) Guppy, ii) Mollies, iii) Sword tail 3.3 Transportation of live aquarium fishes. 3.4 Aquarium water quality and management	Unit-III: Breeding of ornamental fishes (Disease causing organisms Symptoms, treatment and control measures)	11
4	4.1 Protozoan disease 4.2 Bacterial disease 4.3 Crustacean disease 4.4 Fungal disease 4.5 Helminth disease	Unit-IV: Disease management of ornamental fishes (Disease causing organisms Symptoms, treatment and control measures)	10

References:

- Dick Mills (1987). *The Practical Encyclopedia of the Marine Aquarium*. Salamander Books Ltd., London.
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- Saxena, A. (2003). *Aquarium Management*. Daya Publishing House, New Delhi.
- Santhanam, R., Sukumaran, N. and Natarajan, P. (1987). *A Manual of Freshwater Aquaculture*. Oxford & IBH Publishing Co., New Delhi.
- Jagtap, H. S., Mukherjee, S. N. and Garad, V. K. *A Text Book of Pisciculture and Aquarium Keeping*. Daya Publishing House, New Delhi.
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Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,

Four Year UG Program, Fishery Science (w.e.f. June-2026)

B.Sc. Third Year Semester-VI

SYLLABUS

Periods: 45

No. of Credits: 03

Marks: 75

Major Course (Theory)

SFISCT1352: Anatomy and Physiology of Fishes

Course objectives:

1. To understand the external morphology, integument, skeletal and muscular systems of fishes.
2. To study the structure and functions of digestive, respiratory and circulatory systems in fishes.
3. To understand the organization and functions of the nervous, excretory and reproductive systems of fishes.
4. To study osmoregulation, sensory organs and endocrine functions in fishes.
5. To understand the general morphology and internal anatomy of shrimp.

Course outcomes:

After successful completion of this course, students will be able to:

1. Describe the external morphology and structural organization of fishes, including skin, scales, fins, skeleton and muscles.
2. Explain the anatomy and physiological functions of the digestive, respiratory and circulatory systems in fishes.
3. Describe the nervous, excretory and reproductive systems and explain excretion and osmoregulation in fishes.
4. Explain the structure and functions of sensory organs and endocrine glands in fishes.
5. Describe the external morphology and major organ systems of shrimp.

Content

Module	Unit	Title of topic	hrs
1		Unit-I: Introduction to Fish Anatomy and Integumentary System	11
	1.1	Introduction to fish anatomy and physiology	
	1.2	External morphology of fishes	
	1.3	Body shape, size, and coloration	
	1.4	Structure and functions of skin	
	1.5	Scale: Types and structure	
	1.6	Fins: Types, structure, and functions	
	1.7	Skeletal system: axial and appendicular skeleton	
	1.8	Muscular system and locomotion in fishes	
2		Unit-II: Digestive, Respiratory, and Circulatory Systems in fishes	13
	2.1	Digestive System	
		a. Feeding habits and adaptations in fishes	
		b. Structure and function of alimentary canal	
		c. Digestive glands and digestive enzymes	
		d. Physiology of digestion	
	2.2	Respiratory system:	
		a. Structure and function of gills	
		b. Mechanism of respiration in fishes	
		c. Accessory respiratory organs	

	2.3	Circulatory system: a. Structure of Heart b. Arterial system c. Venous system d. Physiology of circulation e. Composition and functions of fish blood	
3	3.1 3.2 3.3 3.4	Unit-III: Nervous system: Brain, spinal cord, and peripheral nerves Urino-genital system a. Excretory system: Kidney, urinary bladder, physiology of excretion b. Physiology of excretion in fishes c. Osmoregulation in freshwater and marine fishes d. Reproductive system: male and female reproductive system Sensory organs: a. Lateral line, b. Eyes, c. Olfactory organs, d. Auditory organs Endocrine glands and hormones in fishes	11
4	4.1 4.2	Unit-IV: Anatomy of Prawn /Shrimp General morphology of Shrimp Anatomy of shrimp: Digestive system, circulatory system, nervous system, circulatory system, respiratory system, reproductive system	10

References:

1. Khanna, S. S. and Singh, H. R. *A Textbook of Fish Biology and Fisheries*. Narendra Publishing House, New Delhi.
2. Lagler, K. F., Bardach, J. E., Miller, R. R. and Passino, D. R. M. (1977). *Ichthyology*. 2nd Ed. John Wiley & Sons, New York.
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13. ICAR (2006). *Handbook of Fisheries and Aquaculture*. Indian Council of Agricultural Research, New Delhi.
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Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,

Four Year UG Program, Fishery Science (w.e.f. June-2026)

B.Sc. Third Year Semester-V

SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Major Course (Theory)

SFISCT1353: Developmental Biology of Fishes

Course objectives:

1. To understand the life cycle, reproductive modes and types of eggs in fishes.
2. To study the major stages of embryonic and post-embryonic development in fishes.
3. To understand the reproductive biology of fishes, including sexual dimorphism, maturity and parental care.
4. To study gametogenesis, fecundity and gonadosomatic index as important aspects of fish reproduction.
5. To understand fish growth and the methods used for determining age and growth in fishes.

Course outcomes:

After successful completion of this course, students will be able to:

1. Describe the life cycles and different modes of reproduction in fishes.
2. Explain the major stages of fish development from fertilization to post-embryonic development.
3. Describe sexual dimorphism, parental care, maturity stages and gametogenesis in fishes.
4. Assess fecundity and gonadosomatic index for the study of fish reproductive biology.
5. Explain fish growth, length-weight relationship and different methods of age and growth determination.

Content

Module	Unit	Title of topic	hrs
1		Unit-I: Introduction	08
	1.1	Introduction to developmental biology of fishes	
	1.2	Life cycles of Indian Major carps and Hilsa	
	1.3	Types of fishes based on reproduction: Oviparity, viviparity & ovo-viviparity	
	1.4	Modes of reproduction in fishes	
	1.5	Types of eggs	
2		Unit-II: Developmental biology	07
	2.1	Breeding and release of gametes	
	2.2	Fertilization of egg	
	2.3	Cleavage	
	2.4	Morula	
	2.5	Blastula	
	2.6	Fate map of Blastula	
	2.7	Gastrulation	
	2.8	Hatching and post embryonic development.	
3		Unit-III: Reproductive biology	

	3.1 Introduction, Definition, 3.2 Sexual dimorphism in Fishes. 3.3 Parental care in fish 3.4 Maturity stages in male and female teleost fish 35. Gametogenesis in fishes: Oogenesis and spermatogenesis 3.6 Assessment of fecundity: i) Volumetric method ii) Gravimetric method iii) Von Bayer's methods 3.7 Study of Gonado Somatic Index (GSI).	08
4	Unit-IV: Growth studies 4.1 Introduction to growth 4.2 Factors affecting growth in fish 4.3 Ponderal index 4.4 Length- weight relationship 4.5 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	07

References:

- Balinsky, B. I. (1981). *An Introduction to Embryology*. 5th Ed. Saunders College Publishing.
- Gilbert, S. F. (2010). *Developmental Biology*. 9th Ed. Sinauer Associates.
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Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,
Four Year UG Program, Fishery Science (w.e.f. June-2026)
B.Sc. Third Year Semester-VI
SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Major Course (Practical)

SFISCP1351: Practical based on SFISCT1351

(Aquarium and Ornamental fish management)

Course objectives:

1. To develop practical skills in aquarium fabrication, setting and maintenance.
2. To familiarize students with commonly used aquarium accessories, ornamental fishes and aquatic plants.
3. To develop skills in identifying sexual dimorphism and setting up aquariums for ornamental fish breeding.
4. To provide practical experience in the culture of live food organisms used for aquarium fishes.
5. To develop basic skills in the identification of fish pathogens, common diseases and their preventive measures.

Course outcomes:

After successful completion of this course, students will be able to:

1. Fabricate, set up and maintain an aquarium using suitable accessories.
2. Identify commonly kept ornamental fishes, aquarium plants and aquarium accessories.
3. Differentiate male and female ornamental fishes and set up aquariums for breeding.
4. Culture commonly used live food organisms for feeding aquarium fishes.
5. Identify common fish pathogens and diseases and apply suitable prophylactic measures.

Content

Module	Unit	Title of topic	hrs
1	1	Fabrication of an aquarium tank of suitable size.	60
	2	Identification and study of aquarium accessories: Aquarium stand, Hood, Filter, Air pump, Air stone, Airline tubing, Heater, Thermometer, light, Gravel, Pebbles, Artificial plants, Fish net, Magnetic glass cleaner, Automatic fish feeder, Feeding ring.	
	3	Setting and Maintenance of an aquarium.	
	4	Identification and study of aquarium ornamental fishes: Goldfish, Siamese fighting fish, Guppy, Sword tail fish, Gourami, Mollies	
	5	Identification and study of aquarium plants: <i>Amazon Sword</i> , <i>Hydrilla</i> , <i>Vallisneria</i> , <i>Ceratophyllum</i> , <i>Cabomba</i>	
	6	Sexual dimorphism in Ornamental fishes	
	7	Setting up of aquarium tank for breeding of aquarium fish species	
	8	Culture of live feed for aquarium fishes: <i>Daphnia</i> / <i>Moina</i> / <i>Tubifex</i> / <i>Infusoria</i> / Hatching of <i>Artemia</i> cyst	
	9	Study of fish pathogens	
	10	Identification of fish diseases and prophylactic measures	
	11	Visit to aquarium shop or centre./ Submission of assignment.	

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

B. Sc. Third Year (NEP 2020)

Effective from June 2026 Semester- VI

Subject: Fishery Science

Major Course (Practical)

SFISCP1351: Practical based on SFISCT1351
(Aquarium and Ornamental fish management)

Centre:

Date:

Time:

Batch No.:

Credits: 02

Marks: 30

- | | | |
|-----------|--|----|
| Q. 1 | Identify and comment on given Aquarium fishes | 06 |
| | a. | |
| | b. | |
| | c. | |
| Q. 2 | Identify and comment on given Aquarium plants | 04 |
| | a. | |
| | b. | |
| Q. 3 | Identify and comment on given Aquarium Accessories | 06 |
| | a. | |
| | b. | |
| | c. | |
| Q. 4 | Setup the given aquarium tank with provided accessories. | 04 |
| OR | | |
| | Prepare setup for breeding of Aquarium fishes. | |
| Q. 5 | Viva-voce | 05 |
| Q. 6 | Student Performance during semester | 03 |
| Q. 7 | Journal / Record book | 02 |

Examiner 1

Examiner 2



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,
Four Year UG Program, Fishery Science (w.e.f. June-2026)
B.Sc. Third Year Semester-VI
SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Major Course (Practical)

SFISCP1352: Practical based on SFISCT1352

(Anatomy and Physiology of Fishes)

Course objectives:

1. To develop practical knowledge of the external morphology, body regions, fins and scales of fishes.
2. To study the structure and organization of major internal organ systems of fishes through dissection.
3. To develop practical understanding of the reproductive biology of fishes, including fecundity and maturity stages.
4. To introduce basic techniques for the histological examination of fish tissues.
5. To study the external morphology of shrimp and prawn and develop skills in anatomical observation and documentation.

Course outcomes:

After successful completion of this course, students will be able to:

1. Identify and describe the external morphological features, body regions, fins and scales of fishes.
2. Dissect and identify the major digestive, respiratory, circulatory, excretory and reproductive organs of fishes.
3. Estimate fish fecundity and identify different maturity stages of the ovary and testis.
4. Examine and identify the basic histological features of fish tissues.
5. Describe the external morphology of shrimp and prawn and present anatomical observations through models, charts and diagrams.

Content

Module	Unit	Title of topic	hrs
1	1	Study of external morphology of fishes.	60
	2	Study of fish scales, Fins and body regions	
	3	Dissection and Study of digestive system of fishes	
	4	Dissection and study of gills and respiratory organs of fishes	
	5	Dissection and Study of circulatory system of fishes	
	6	Dissection and Study of Excretory system of fishes	
	7	Dissection and Study of Reproductive system of fishes	
	8	Estimation of fish fecundity	
	9	Study of maturity stages in ovary and testis of fishes	
	10	Histological examination of fish tissues	
	11	Study of external morphology of Shrimp/Prawn.	
	12	Preparation and submission of anatomical model/Chart/ diagrams, etc	

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

Faculty of Science and Technology

B. Sc. Third Year (NEP 2020)

Effective from June 2026 Semester- VI

Subject: Fishery Science

Major Course (Practical)

SFISCP1351: Practical based on SFISCT1352

(Anatomy and Physiology of Fishes)

Centre:

Date:

Time:

Batch No.:

Credits: 02

Marks: 30

Q. 1 Dissect available fish to exposesystem. 08
(Digestive system/Circulatory system/reproductive system)

Q. 2 Dissect available fish to expose 08
(Brain/Excretory system/Air bladder)

OR

Prepare tissue sample for Histological examination.

Q. 3 Identify and comment on given spots (One each from Scale, Fin,) 04
a.
b.

Q. 4 Viva-voce 05

Q. 5 Student Performance during semester 03

Q. 6 Journal / Record book 02

Examiner 1

Examiner 2



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,
Four Year UG Program, Fishery Science (w.e.f. June-2026)
B.Sc. Third Year Semester-VI
SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Major Elective Course (Theory)

SFISSET1351: A. Fishing Gear and Craft Technology

Course objectives:

1. To understand the classification, construction materials and accessories of fishing gears.
2. To study the fabrication, care, maintenance and preservation of fishing gears.
3. To understand the classification, construction materials and equipment of inland and marine fishing crafts.
4. To study traditional and conventional fishing methods and the operation of major fishing gears.
5. To introduce unconventional fishing methods and modern equipment used in fishing and navigation.

Course outcomes:

After successful completion of this course, students will be able to:

1. Classify fishing gears and describe the materials and accessories used in their construction.
2. Explain the basic principles of fishing gear fabrication, maintenance and preservation.
3. Classify inland and marine fishing crafts and describe their construction materials, equipment and maintenance.
4. Distinguish between traditional, active and passive fishing methods and explain the operation of major fishing gears.
5. Explain the use of unconventional fishing methods and modern equipment such as echosounder, SONAR, RADAR, GPS and radio in fishing operations.

Content

Module	Unit	Title of topic	hrs
1		Unit-I: Fishing Gears	08
	1.1	Introduction and classification of fishing gears	
	1.2	Material used in manufacture of fishing gear	
	1.3	Fishing gear accessories	
	1.4	Different types of Fishing Gears	
	1.5	Fabrication of fishing gear	
	1.6	Care, maintenance and preservation of fishing gear	
2		Unit-II: Fishing craft	07
	2.1	Introduction and classification of fishing craft	
	2.2	Material used for manufacture of fishing craft	
	2.3	Fishing craft accessories/deck equipment's	
	2.4	Care and maintenance of fishing crafts	
	2.5	Different fishing crafts: i) Inland fishing crafts ii) Sea fishing crafts.	
3		Unit-III: Fishing Methods	
	3.1	History/Evolution of Fishing	08

	3.2	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	
4	4.1 4.2	Unit-IV: Unconventional fishing methods and equipment Unconventional fishing methods: a. Light Fishing b. Electro fishing c. Jigging Equipment: a. Fish Finder/Echosounder b. SONAR c. RADAR d. GPS e. Radio	07

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Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,
Four Year UG Program, Fishery Science (w.e.f. June-2026)
B.Sc. Third Year Semester-VI
SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Major Elective Course (Theory)

SFISSET1351: B. Fish Nutrition and Feed Manufacturing Technology

Course objectives:

1. To understand the fundamentals of fish nutrition and the role of major nutrients in fish growth.
2. To study the nutritional requirements of cultivable fishes and commonly used feed ingredients and additives.
3. To understand different types and forms of feeds used in aquaculture.
4. To study the principles of feed formulation, processing, storage and quality control.
5. To understand feeding strategies and common nutritional deficiency diseases in fishes.

Course outcomes:

After successful completion of this course, students will be able to:

1. Explain the role and nutritional requirements of major nutrients in fish growth.
2. Identify suitable feed ingredients and additives used in aquaculture feeds.
3. Distinguish between different types and forms of fish feeds.
4. Formulate and describe the processing, storage and quality control of fish feeds.
5. Apply suitable feeding strategies and identify common nutritional deficiency diseases in fishes.

Content

Module	Unit	Title of topic	hrs
1	Unit-I: 1.1 1.2 1.3 1.4 1.5 1.6	Introduction and fundamentals of fish nutrition and growth in fish. Principal nutrients and nutritional requirements of cultivable fishes Protein Fat/Lipid Carbohydrate Vitamin	08
2	Unit-II: 2.1 2.2 2.3 2.4	Feed ingredients: Animal and plant origin. Feed Additives: Binder, Antioxidants, Antimicrobial agents, Chemoattractant, Feeding stimulus, pigments, Probiotics and miscellaneous additives Types of feed : Wet feeds, moist feeds, dry feeds, mash, pelleted feeds, floating and sinking pellets. Forms of Feed: Spray dried diet, Micro-bound diet, micro encapsulated diet, flake diet	07
3	Unit-III: 3.1	Selection of Ingredients and Additives,	08

	3.2	Formulation of Feed: Pearson's square method, linear programming method	
	3.3	Feed Processing: Grinding, Mixing, Pelleting, Floating pellets, Cooling / Drying, Crumbling, Fat spraying, Bagging, Feed Storage and Quality Control	
4		Unit-IV:	07
	4.1	Feeding Strategies a. Feeding rate b. Feeding Frequency Size of feed particles c. Feeding methods	
	4.2	Nutrition deficiency diseases: Avitaminosis, Mineral deficiency, Starvation.	

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Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,
Four Year UG Program, Fishery Science (w.e.f. June-2026)
B.Sc. Third Year Semester-VI
SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Major Elective Course (Practical)

SFISEP1351: A. Practical based on SFISSET1351

(A. Fishing Gear and Craft Technology)

Course objectives:

1. To develop practical knowledge of commonly used fishing gears, hooks, lines and gear accessories.
2. To develop basic skills in fishing net fabrication and preparation of different types of knots.
3. To familiarize students with different fishing crafts, construction materials and deck equipment.
4. To provide practical knowledge of equipment used in unconventional and modern fishing operations.
5. To provide field exposure to fishing activities through visits to fish landing centres and fish markets.

Course outcomes:

After successful completion of this course, students will be able to:

1. Identify and describe commonly used fishing gears, hooks, lines and gear accessories.
2. Fabricate basic fishing nets and prepare different types of knots used in fishing operations.
3. Identify fishing crafts, their construction materials and commonly used deck equipment.
4. Explain the use of equipment associated with light fishing, electrofishing, echosounders and GPS.
5. Observe and document fishing operations and related activities through field visits and preparation of models.

Content

Module	Unit	Title of Practical	hrs
1	1	Study of fishing gears (any four)	60
	2	Study of fishing hooks & lines	
	3	Study of fishing gear accessories	
	4	Fabrication of fishing nets	
	5	Study of fishing crafts (any four)	
	6	Study of fishing crafts materials	
	7	Study of deck equipments used in fishing craft.	
	8	Study of different types of knots.	
	9	Study of equipments used in nonconventional fishing: Light fishing, Electro fishing, Echosounder, GPS	
	10	Submission of prepared models of fishing crafts/ gears.	
	11	Visit to fish landing centres/ fish market	

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Faculty of Science and Technology
B. Sc. Third Year (NEP 2020)
Effective from June 2026 Semester- VI
Subject: Fishery Science
Major Elective Course (Practical)
SFISEP1351: A. Practical based on SFISSET1351
(A. Fishing Gear and Craft Technology)

Centre:

Date:

Time:

Batch No.:

Credits: 02

Marks: 30

Q. 1 Fabricate netting from given twin and accessories. 06

OR

Carry out shaping / Tailoring the given netting material as per instruction.

Q. 2 Identify and comment on given spots (Two each from Fishing Craft and Gears) 08

a.

b.

c.

d.

Q. 3 Identify and comment on given spots (Any three from Fishing gear Accessory/Deck Equipment/Material used for Fishing gear and craft) 06

a.

b.

c.

Q. 4 Viva-voce 05

Q.5 Student Performance during semester 03

Q. 6 Journal / Record book 02

Examiner 1

Examiner 2



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,
Four Year UG Program, Fishery Science (w.e.f. June-2026)
B.Sc. Third Year Semester-VI
SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Major Elective Course (Practical)
SFISEP1351: B. Practical based on SFISSET1351

(B. Fish Nutrition and Feed Manufacturing Technology)

Course objectives:

1. To familiarize students with commonly used fish feed ingredients and feed manufacturing equipment.
2. To develop practical skills in the analysis of major nutritional components of feed ingredients and formulated feeds.
3. To develop skills in fish feed formulation based on the nutritional requirements of fishes.
4. To provide hands-on experience in the preparation of fish feed using locally available ingredients.
5. To develop practical understanding of feeding rate, feeding frequency and physical quality of fish feeds.

Course outcomes:

After successful completion of this course, students will be able to:

1. Identify commonly used fish feed ingredients and equipment used in feed manufacturing.
2. Analyse feed ingredients and formulated feeds for moisture, protein, lipid, ash and carbohydrate content.
3. Formulate fish feed according to the required protein level using available feed ingredients.
4. Prepare fish feed using locally available ingredients and appropriate processing methods.
5. Calculate feeding rate and feeding frequency and evaluate the sinking rate and water stability of fish feeds.

Content

Module	Unit	Title of Practical	hrs
1	1	Study of different ingredients used in fish feed.	60
	2	Study of different equipments used in feed manufacture industry	
	3	Analysis of feed ingredients and feeds for Moisture content.	
	4	Analysis of feed ingredients and feeds for Protein content.	
	5	Analysis of feed ingredients and feeds for Fat/ Lipid content.	
	6	Analysis of feed ingredients and feeds for Ash content.	
	7	Analysis of feed ingredients and feeds for Carbohydrate content.	
	8	Formulation of fish feed as per protein requirement with available feed ingredients.	
	9	Preparation of fish feed using locally available feed ingredients.	
	10	Calculation of feeding rate and feeding frequency	
	11	Determination of sinking rate and stability of feeds.	
	12	Submission of prepared fish feed/fish feed ingredients	

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Faculty of Science and Technology
B. Sc. Third Year (NEP 2020)
Effective from June 2026 Semester- VI
Subject: Fishery Science
Major Elective Course (Practical)
SFISEP1351: B. Practical based on SFISSET1351
(B. Fish Nutrition and Feed Manufacturing Technology)

Centre:

Date:

Time:

Batch No.:

Credits: 02

Marks: 30

Q. 1 Formulate the fish feed containing protein% with given input. 06

OR

Estimate the sinking rate of given feed sample.

Q. 2 Analyze given feed sample for estimation of content 08
(Moisture, Protein, Fat/ Lipid)

Q. 3 Identify and comment on given spots (Any three from Fish Feed, feed ingredient, 06
Feed Manufacture equipment)

a.

b.

c.

Q. 4 Viva-voce 05

Q.5 Student Performance during semester 03

Q. 6 Journal / Record book 02

Examiner 1

Examiner 2



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,

Four Year UG Program, Fishery Science (w.e.f. June-2026)

B.Sc. Third Year Semester-VI

SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Vocational Course (Practical)

SFISVC1351: A. Breeding of Aquarium Fishes and Plants

Course objectives:

1. To introduce commercially important egg-laying and live-bearing ornamental fishes.
2. To develop practical skills in the breeding of different groups of ornamental fishes.
3. To understand the breeding behaviour and reproductive requirements of aquarium fishes.
4. To familiarize students with commonly used aquarium plants and their importance.
5. To develop practical knowledge of different methods used for the propagation of aquarium plants.

Course outcomes:

After successful completion of this course, students will be able to:

1. Identify important egg-laying and live-bearing ornamental fishes.
2. Select and apply suitable breeding techniques for different groups of ornamental fishes.
3. Breed egg-scattering, egg-depositing, nest-building and live-bearing ornamental fishes.
4. Identify commonly used aquarium plants and explain their importance in an aquarium.
5. Propagate aquarium plants using stem cuttings, runner separation, rhizome division and adventitious plantlets.

Content

Module	Unit	Title of topic	hrs
1	1	Introduction	60
	2	Study of important ornamental fishes	
		Egg layers: i) Siamese fighting fish, ii) Gold fish, iii) Zebra danio, iv) Gourami V) Angel Fish	
		Live Bearers: i) Guppy, ii) Mollies, iii) Sword tail, iv) Platty	
	3	Breeding of egg-scatterers: Gold fish	
	4	Breeding of egg-depositors: Angel fish	
	5	Breeding of nest-builders: Siamese fighting fish, Gourami	
	6	Breeding of live-bearers: Guppy, Mollies, Sword tail	
	7	Study of important Aquarium plants: <i>Amazon Sword, Hydrilla, Vallisneria, Ceratophyllum, Cabomba</i>	
	8	Study of propagation of Aquarium plants: Stem Cuttings, Runner Separation, Rhizome Division, and Adventitious Plantlets	
	9	Importance of plants in aquarium	



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,
Four Year UG Program, Fishery Science (w.e.f. June-2026)
B.Sc. Third Year Semester-VI
SYLLABUS

Periods: 30

No. of Credits: 02

Marks: 50

Vocational Course (Practical)

SFISVC1351: B. Manufacture of Fishing Nets

Course objectives:

1. To introduce the basic materials, components and accessories used in the manufacture of fishing nets.
2. To understand the physical, chemical and biological properties of natural and synthetic netting materials.
3. To develop skills in the identification of synthetic netting yarns and understanding their construction and twists.
4. To familiarize students with ropes, floats, sinkers, buoys, anchors and other fishing gear accessories.
5. To develop practical skills in fishing net fabrication, repair, care and maintenance.

Course outcomes:

After successful completion of this course, students will be able to:

1. Identify and classify natural and synthetic materials used in fishing net manufacture.
2. Describe the properties, construction and types of netting yarns and ropes.
3. Identify and select suitable floats, sinkers, buoys, anchors and other fishing gear accessories.
4. Apply appropriate methods for the care, maintenance and repair of fishing gears.
5. Fabricate fishing nets using basic techniques of braiding, webbing, knots, bends and hitches.

Content

Module	Unit	Title of topic	hrs
1	1	Introduction to fishing gear	60
	2	Fishing gear materials- a) Classification of fishing gear materials: Natural fibers, synthetic fibers,	
	3	Basic fiber forms	
	4	Properties of fibers: a) Physical properties, b) Chemical properties, c) Biological properties	
	5	Identification of synthetic netting yarns	
	6	Construction of netting yarns, b) Twist- types of twists	
	7	Ropes- Types and Classification of ropes	
	8	Floats- classification of floats	
	9	Sinkers- types of sinkers	
	10	Buoys- Types of buoys	
	11	Anchors- Parts and Types	
	12	Fishing gear accessories	
	13	Care and Maintenance of fishing gear	
	14	Fabrication of fishing gear- Braiding, Tailoring of webbing, Knots, Bends, Hitches etc.	

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

B. Sc. Third Year (NEP 2020)

Effective from June 2026 Semester- VI

Subject: Fishery Science

Vocational Course (Practical)

SFISVC1351: A. Breeding of Aquarium Fishes and Plants OR B. Manufacture of Fishing Nets

Centre:

Date:

Time:

Batch No.:

Credits: 02

Marks: 30

Sr. No.	End Semester Assessment (ESA)	Maximum Marks	Marks Obtained
1	Vocational Course Report Submission/Assessment	10	
2	Overall Judgment of Performance During Course	10	
3	Course Work Presentation/ Viva-voce	10	
	Total Marks	30	

Examiner 1

Examiner 2



Swami Ramanand Teerth Marathwada University, Nanded
Faculty of Science and Technology,
Four Year UG Program, Fishery Science (w.e.f. June-2026)
B.Sc. Third Year Semester-VI
SYLLABUS

Periods: 120

No. of Credits: 04

Marks: 100

SFISOJ1351: On Job Training

Course objectives:

1. To provide students with direct exposure to professional work environments related to Fishery Science.
2. To develop practical skills through participation in fisheries, aquaculture, processing, research or other related activities.
3. To bridge the gap between theoretical knowledge and its practical application in the workplace.
4. To familiarize students with the day-to-day operations and management of fisheries-related establishments.
5. To develop skills in observation, data collection, record keeping and technical documentation.
6. To improve problem-solving and decision-making abilities in real work situations.
7. To develop professional qualities such as punctuality, responsibility, teamwork and workplace discipline.
8. To enhance communication, report writing, presentation and employability skills.

Course outcomes:

After successful completion of this course, students will be able to:

1. Apply knowledge of Fishery Science in a real working environment.
2. Perform basic technical and operational activities related to the organization or establishment where the training is undertaken.
3. Demonstrate practical skills relevant to aquaculture, capture fisheries, fish processing, research or other fisheries-related activities.
4. Observe and understand the organization, management and routine functioning of a fisheries-related workplace.
5. Collect, maintain and interpret records and information related to the work carried out during the training.
6. Demonstrate professional behaviour, teamwork, responsibility and workplace discipline.
7. Identify practical problems and develop appropriate approaches to address them.
8. Prepare a systematic training report and effectively present and defend the work carried out during the On Job Training.

GUIDELINES

For successful completion of On Job Training (SFISOJ1351), student will work for a period as per the guidelines of SRTM University, Nanded.

Students can complete their On Job Training at any of the following -

1. Fish farm carrying out aquaculture practices.
2. Reservoir with fishery activity
3. Society/NGO/Self help groups/Institutes engaged in fishery activity.
4. Fish processing plant/ industry.
5. Laboratory, department, farm, etc. at educational/research institute carrying out fishery activity.
6. Any other establishment carrying out fishery related activity.

Student should complete On Job Training as per University guidelines and institutional requirements. The students will prepare and submit type written detailed final report based on the work done during On Job Training.

The Student will be assessed by examiners for On Job Training (**SFISOJ1351**) based on his report, Performance, presentation and viva-voce during university practical examination.

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Faculty of Science and Technology
B. Sc. Third Year (NEP 2020)
Effective from June 2026 Semester- VI
Subject: Fishery Science
SFISOJ1351: On Job Training

Centre:

Date:

Time:

Batch No.:

Credits: 04

Marks: 60

Sr. No.	End Semester Assessment (ESA)	Maximum Marks	Marks Obtained
1	Report Submission	25	
2	Performance during On Job Training	15	
3	Presentation of OJT Work	10	
4	Viva-voce	10	
	Total Marks	60	

Examiner 1

Examiner 2

References:

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