Lecture Schedule

Department of Fisheries Resource Management (Code-FRM)

(1) - FRM-122, Taxonomy of Finfish		
	Theory	
S.No.	**Topic**	**Class**
1	Principles of taxonomy. Nomenclature, types. Classification and interrelationships.	4
2	Criteria for generic and specific identification.	1
3	Morphological, morphometric and meristic characteristics of taxonomic significance.	3
4	Major taxa of inland and marine fishes up to family level.	1
5	Commercially important Inland and marine fishes of India and their morphological characteristics.	2
6	Introduction to modern taxonomic tools: karyo taxonomy, DNA barcoding, protein analysis and DNA polymorphism.	3
Total		**14**
	Practical	
1	Collection and identification of commercially important inland and marine fishes.	5
2	Study of commercially important inland and marine fishes external morphology and internal features.	8
3	Visit to fish landing centers to study commercially important fishes and catch composition.	5
Total		**18**

(2) - FRM-112, Taxonomy of Shellfish		
	Theory	
S.No.	**Topic**	**Class**
1	Study of morphology and meristic characteristics of crustacean –shrimp.	1
2	Study of morphology and meristic characteristics of crustacean- prawn.	1
3	Study of morphology and meristic characteristics of crustacean-lobster.	1
4	Study of morphology and meristic characteristics of crustacean-crab.	1
5	Study of morphology and meristic characteristics of Mollusca-Bivalves.	1
6	Study of morphology and meristic characteristics of Mollusca –gastropods	1
7	Study of morphology and meristic characteristics of Mollusca -cephalopods	1
8	Classification of crustacean up to the level of species with examples of commercially important species.	3
9	Classification of mollusca up to the level of species with examples of commercially important species.	3
Total		**13**
	Practical	
1	Study of morphology.	2
2	Collection, preservation and identification of commercially important prawns.	2
3	Collection, preservation and identification of commercially important Shrimps.	2
4	Collection, preservation and identification of commercially important Crabs.	2
5	Collection, preservation and identification of commercially important Lobsters.	2
6	Collection, preservation and identification of commercially important Bivalves.	2
7	Collection, preservation and identification of commercially important Gastropods.	2
8	Collection, preservation and identification of commercially important cephalopods from natural habitats.	2
9	Field visits for collection and study of commercially important shellfishes.	3
Total		**19**

(3) - FRM-121, Anatomy and Biology of Finfish		
	Theory	
S.No.	**Topic**	**Class**
1	Study of anatomy of important groups of finfish (herbivores, carnivores, omnivores).	3
2	Study of oral region and associated structures.	2
3	Digestive system and associated digestive glands.	2
4	Food and feeding habits of commercially important fishes.	2
5	Qualitative and quantitative methods of analysis of gut contents.	2
6	Circulatory system, respiratory system, nervous system, urino-genital system, endocrine system, skeletal systems and sensory organs.	7
7	Reproductive biology – maturity stages, gonado-somatic index, ponderal index, fecundity, sex ratio and spawning.	3
8	Eggs and larval stages and developmental biology.	2
9	Age and growth determination by direct and indirect methods.	2
10	Fish migration - type and significance.	1
11	Tagging and marking.	2
Total		**28**
	Practical	
1	Study of internal organs – digestive System	2
2	Study of internal organs Respiratory system	2
3	Study of internal organs Circulatory system	1
4	Study of internal organs Urino-genital system	2
5	Study of internal organs Nervous system	1
6	Study of internal organs Skeletal system	1
7	Study of internal organs Endocrine system.	2
8	Analysis of gut contents.	1
9	Estimation of age and growth by direct and indirect methods.	2
10	Classification of maturity stages.	2
11	Estimation of fecundity.	1
12	Study of development stages.	2
13	Tagging and marking.	2
14	Gonado Somatic Index.	1
15	Ponderal index.	1
Total		**23**

(4) - FRM-311, Anatomy and Biology of Shellfish		
	Theory	
S.No.	**Topic**	**Class**
1	Study of external and internal organization of commercially important crustaceans and molluscs.	3
2	Digestive, respiratory, circulatory, nervous and reproductive systems.	5
3	Food and feeding habits, growth, moulting, length – weight relationship.	4
4	Reproductive biology, larval stages.	4
5	Age and growth determination by direct and indirect methods.	2
Total		**18**
	Practical	
1	Study of Internal Organs commercially important crustaceans and molluscs.	4
2	Study of Digestive, respiratory, circulatory, nervous and reproductive systems.	5
3	Study of food and feeding habits - analysis of gut contents.	3
4	age and growth.	2
5	length - weight relationship and condition.	3
6	Reproductive biology: maturity stages, spawning, periodicity, fecundity and larval stages.	4
Total		**21**

(5) - FRM-211, Physiology of Finfish and Shellfish		
	Theory	
S.No.	**Topic**	**Class**
1	Water as a biological medium.	2
2	Gas exchange; Circulation; Excretion; Osmoregulation.	5
3	Reproductive physiology.	3
4	Muscle physiology.	3
5	Sense organs.	3
6	Energy and nutrient status of food.	2
7	Nitrogen balance.	2
8	Standard and active metabolism.	2
9	Energy utilization.	2
10	Effect of environmental factors on physiology of fin and shellfishes.	4
11	Stress related physiological changes.	2
Total		**30**
	Practical	
1	Estimation of oxygen consumption, Osmoregulation, ammonia excretion and carbon- dioxide output.	4
2	Influence of temperature and salinity on metabolism.	6
3	Haematology of fin and shellfishes.	4
4	Histological techniques.	4
Total		**18**

(6) - FRM-111, Inland Fisheries		
	Theory	
S.No.	**Topic**	**Class**
1	Freshwater fishery regions of the world and their major fish species composition.	4
2	Global inland fish production data. Capture fishery resources of India.	3
3	Potential of inland water bodies with reference to respective state.	4
4	Problems in the estimation of inland fish catch data.	2
5	Fishing crafts and gears.	4
6	Major riverine and estuarine systems of India.	2
7	Major brackish water lakes and their fisheries.	2
8	Fisheries of major reservoirs / natural lakes of India.	4
9	Flood-plain capture fishery- present status of their exploitation and future prospects.	2
10	Cold water fisheries of India.	2
11	Management and conservation of rivers, reservoirs, lakes and waterlogged areas.	4
Total		**33**
	Practical	
1	Analysis of species composition of commercial catches at landing and assembling centres	4
2	Sampling and familiarization of commercially important groups.	2
3	Observations and experimental operations of selected fishing crafts and gears in inland / estuarine waters.	4
4	Maintenance of records on catch data.	2
5	Visit to Dept. of fisheries	1
5	Visit to Dept. of lakes	1
7	Visit to Dept. of reservoirs	1
8	Visit to net making yards.	1
Total		**16**

(7) - FRM-312, Marine Fisheries		
	Theory	
S.No.	**Topic**	**Class**
1	Classification and definition of fishery zones and fishery resources of world.	3
2	Overview of marine fisheries resources of the world and India.	3
3	Major exploited marine fisheries of India, their developmental history and present status.	4
4	Important pelagic - demersal fish, shellfish and seaweed resources of India.	15
5	Traditional, motorized and mechanized fisheries according to major gears.	3
6	Potential marine fishery resources of the India's EEZ.	3
7	GIS and Remote sensing in marine capture fishery.	2
Total		**33**
	Practical	
1	Visit to fish landing centres, Observation and analysis of catches by major crafts and gears.	6
2	Field collection of fishes, crustaceans, molluscs and seaweeds and record keeping of relevant data.	6
3	Participation in fishing cruises.	4
4	GIS and remote sensing in marine capture fishery.	2
Total		**18**

(8) - FRM-313, Fish Population Dynamics and Stock Assessment		
	Theory	
S.No.	**Topic**	**Class**
1	The concept of population and unit stock.	1
2	Biological structure of fisheries resource in space and time.	1
3	Indicators of dynamics in a fishery resource.	1
4	Characteristics of unit and mixed stock.	1
5	Data requirements for stock assessment.	2
6	Segregation of stocks.	2
7	Principles of stock assessment.	2
8	Population age structure.	2
9	Theory of life tables.	1
10	Von Bertalanffy growth parameters. Graphical models.	2
11	Monte Cario simulation model and ECOPATH model.	2
12	Estimation of total fishing and natural mortality.	1
13	The concept of yield, yield in number and yield in weight, yield per recruit, yield curve and Yield models.	3
14	The concept of Maximum Sustainable Yield and Maximum Economic Yield.	2
15	Biological symptoms of under-fishing and over-fishing.	2
16	Growth over-fishing and recruitment over-fishing.	2
17	Eumetric fishing.	1
18	Open access fisheries.	2
19	Fisheries regulations.	2
20	CPUE.	1
21	Trawl selection and gillnet selection.	2
22	Analytical models of fish stocks.	1
Total		**36**
	Practical	
1	Study of length – weight relationship.	2
2	Segregation of stock using direct methods.	1
3	Study of analytical models: Beverton and Holt model.	2
4	VBGF,	2
5	Pauly's integrated methods,	1
6	Graphical models.	1
7	Estimation of Z, F and M.	1
8	Estimation of net selectivity coefficient.	2
9	Fitting of surplus production model.	1
10	Schaeffer model,.	2
11	Fox model.	1
12	Study of yield isopleth diagrams.	2
13	Micro-computer packages ELEFAN, FISAT.	2
Total		**20**

(9) - FRM-212, Aquatic Mammals, Reptiles and Amphibians		
	Theory	
S.No.	**Topic**	**Class**
1	Selected aquatic mammal, reptile, and amphibian and birds species of India relevant to fisheries: taxonomic status, identification characters, distribution, abundance, habitat, exploitation, threats and conservation.	3
2	Biology of aquatic animals Cetaceans-whales. dolphins,	1
3	Biology of aquatic animals Cetaceans-dolphins	1
4	Biology of aquatic animals Cetaceans-porpoises	1
5	Biology of aquatic animals Cetaceans–narwal.	1
6	Biology of aquatic animals Sirenia-manates.	1
7	Biology of aquatic animals Sirenia-dugongs.	1
8	Biology of aquatic animals Carnivore-seals.	1
9	Biology of aquatic animals Carnivore-sea lions	1
10	Biology of aquatic animals Carnivore-walruses.	1
11	Biology of aquatic animals Carnivore- polar bear	1
12	Biology of aquatic animals Carnivore-otter.	1
13	Biology of aquatic animals Sea turtles.	1
14	Biology of aquatic animals tortoise.	1
15	Biology of aquatic animals crocodiles	1
16	Biology of aquatic animals sea/freshwater snakes and amphibians.	2
17	IUCN criteria – Red list, Wild Life (Protection) Act.	1
Total		**20**