

**DEPARTMENT OF INDUSTRIAL FISH AND FISHERIES**  
**LESSION PLAN**  
**SESSION 2023-24**  
**SEMESTER – III**

**NAME OF TEACHER: TINKEY ACHARYA**

**PAPER ALLOTTED: IFFACOR05T, IFFACOR05P, IFFACOR07T, IFFACOR07P**

<b>Month</b>	<b>Paper</b>	<b>Topic</b>	<b>No of classes</b>
<b>September 2023</b> (25.09.23)	<b>IFFACOR05T</b>	<b>Chartered fishing in India- policies and problems. Marine fish production in India - Estimated fishery resources – inshore – offshore - deep sea resource.</b>	<b>4</b>
<b>October 2023</b>	<b>IFFACOR05T</b>	<b>Marine Fisheries - Deep Sea Resources Major deep sea resources - fishes, shrimps, lobsters – status of deep sea fishing in India.</b>	<b>6</b>
	<b>IFFACOR05P</b>	<b>Analysis of water quality (salinity, phosphate, nitrate). Analysis of species composition of commercial catches at landing and assembling centres, sampling and familiarization of commercially important groups.</b>	<b>10</b>
	<b>IFFACOR07T</b>	<b>Fishing Crafts Different types of fishing crafts in India- inland and marine – traditional, motorized and mechanized, trawlers, gill netters, purse seiners, long liners, trollers. Boat building materials – Wood, FRP, Cement, Steel and its advantages &amp; disadvantages. Wood preservation techniques. Basic terminology related to boat design. Otter boards &amp; its type</b>	<b>10</b>
	<b>IFFACOR07P</b>	<b>Identification of traditional &amp; modern fishing gears – Using FAO catalogue Fishing accessories ( floats, ropes, sinkers, swivels, shackles, fishing rods) Identification of synthetic and natural fibres Different types of hooks and baits</b>	<b>12</b>
<b>October 2023</b>		<b>PUJA VACATION (19.10.2023 to 15.11.2023)</b>	
	<b>IFFACOR05T</b>	<b>Fishery assessment and regulations. Economic and biological overfishing. Conservation and regulation of fishing pressure. Deep sea fishing policy.</b>	<b>10</b>

	<b>IFFACOR07T</b>	<b>Fishing Gears</b> Traditional and modern fishing gears ; Fishing gear materials - natural and synthetic, yarn numbering systems, types of knots, knotless netting, meshes, braiding, shaping, creasing, baiting, fly-meshing, tailoring; Mounting of webbing – different methods, hanging coefficient, take up ratio; Modern commercial fishing methods- Operation and classification of trawling, purse seining, lampara net fishing, gill netting, line fishing. Squid jigging. Fishing accessories-hooks, floats, sinkers and ropes.	<b>10</b>
	<b>IFFACOR07P</b>	Determination of moisture content in fish and fishery products Calculation of ice for chilling fishes Filleting of fish Drying of fish. Organoleptic analysis of canned product Visit to Fish Processing center	<b>10</b>
<b>1<sup>st</sup> Week of Dec 2023</b>	<b>IFFACOR07T</b>	<b>Responsible Fisheries and Fisheries Legislation</b> Concept of Responsible Fisheries; Monsoon trawl ban, closed season, mesh size regulations, juvenile fishing, Exclusive Economic Zone (EEZ), Coastal Regulation Zone (CRZ), Integrated Coastal Zone Management (ICZM). MSY, MEY, Over fishing, Recruitment over fishing, Aquaranching. Indian fisheries Act.1976. Coast Guard Act.1978, Maritime zones of India Act. 1981	<b>5</b>
<b>3<sup>rd</sup> Week of Dec 2023</b>		<b>Internal Examination &amp; Class for Slow Learners</b>	
<b>January 2024</b>		<b>End Semester Examination</b>	
		<b>Total Classes</b>	<b>77</b>

**NAME OF TEACHER: DR. NANDITA MUKHERJEE**

**PAPER ALLOTTED: IFFACOR05T, IFFACOR05P, IFFACOR06T, IFFACOR06P, IFFACOR07T, IFFACOR07P**

<b>Month</b>	<b>Paper</b>	<b>Topic</b>	<b>No of classes</b>
<b>September 2023 (25.09.23)</b>	<b>IFFACOR05T</b>	<b>Reservoir and Estuarine Fisheries</b> Reservoir fisheries- Major reservoirs in India- capture fisheries, fishing methods, problems encountered in fisheries development.	<b>4</b>
	<b>IFFACOR06T</b>	<b>Larval nutrition</b> Quality requirements of larval feeds (particle size and digestibility), Bacterioplankton, phytoplankton and zooplankton and their role in larval nutrition. Bio-enrichment, biofilm /periphyton and its uses. Culture of single cell proteins and their	<b>10</b>

		<b>nutritional quality.</b>	
<b>October 2023</b>	<b>IFFACOR05T</b>	<b>Estuarine fisheries- definition and classification of estuaries- capture fisheries resident and migrant species, fishing methods, problems encountered in fisheries development of major estuaries. Backwater fishery resources of India and its potential.</b>	<b>6</b>
	<b>IFFACOR05P</b>	<b>Analysis of water quality (salinity, phosphate, nitrate). Analysis of species composition of commercial catches at landing and assembling centres, sampling and familiarization of commercially important groups. Observations and experimental operations of selected fishing gears in inland / estuarine waters.</b>	<b>10</b>
	<b>IFFACOR06T</b>	<b>Nutrient requirement of fish &amp; Feed ingredients Principles of fish nutrition. Role of nutrients: Proteins and amino acids, fatty acids and lipids, carbohydrates, vitamins and minerals. Non-protein nitrogen sources. Role of natural food in fish nutrition. Feed additives - Pigments, immunostimulants, Chemo-attractants, Feed stimulants, Growth promoters, Preservatives; anti-nutritional factors. Criteria for the selection of ingredients for feed preparation. Different feed ingredients- animal, plant, microbial in origin, Fish meal, SCP, silages, fermented products. Storage, quality standards, proximate composition and chemical evaluation.</b>	<b>10</b>
	<b>IFFACOR06P</b>	<b>Identification of feed ingredients Processing of feed ingredients Feed additives Feed formulation and preparation</b>	<b>8</b>
<b>October 2023</b>		<b>PUJA VACATION (19.10.2023 to 15.11.2023)</b>	
<b>November 2023</b>	<b>IFFACOR06T</b>	<b>Fish Feed and feed manufacturing Types of feed: Dry (pellets, flakes, powdered, micro-encapsulated, microbound and micro-coated diets, Particle assisted rotationally agglomerated microparticulate diet (PARA); Marumerized extruded microparticulate diet (MEM); nano diets, non-dry. Feed formulation methods - Pearson's method, quadratic equation, linear programming; limitations. Feed manufacturing equipments and processes: Pulverizer, grinder, mixer, pelletizer, crumbler, drier, Extruder/ Expander, Vacuum coater, fat sprayer. Different</b>	<b>10</b>

		size and grades of fish / shrimp feeds – starter, grower and finisher feeds. Storage and transportation of feeds. Quality problems- toxins, pests, rancidity.	
	IFFACOR06P	Determination of sinking rate and water stability of feeds. Determination of proximate composition of feed Estimation of physical properties of feed: Bulk density, water absorption, expansion ratio, sinking velocity. Extraction & Analysis techniques of Carbohydrates, Proteins & Lipids.	8
	IFFACOR07T	Quality Assurance and Export of Fishery Products Quality control – basic concepts, quality and quality control. Sanitation procedures in seafood processing plants. Waste management in fish processing industries. Risk factors in seafood biotoxins, seafood pathogens, endogenous parasites. Methods of evaluating fish freshness and quality or organoleptic, physical, chemical, microbiological and instrumental methods. Quality control programmes - pre-shipment inspection, IPQC, MIPQC, HACCP and ISO Series in seafood industry. Quality standards in India and major importing countries like USA, Japan and EU.	10
	IFFACOR07P	Determination of moisture content in fish and fishery products Calculation of ice for chilling fishes Filleting of fish Drying of fish. Organoleptic analysis of canned product Visit to Fish Processing center	8
1 <sup>st</sup> Week of Dec 2023	IFFACOR07T	Export of fishery products from India – major countries, important products, export documents and procedures. Traceability, Quality certifications, Ecolabelling.	4
3 <sup>rd</sup> Week of Dec 2023		Internal Examination & Class for Slow Learners	
January 2024		End Semester Examination	
		Total Classes	88

NAME OF TEACHER: DR. DIBYENDU DUTTA

PAPER ALLOTTED: IFFACOR05T, IFFACOR05P, IFFACOR06T, IFFACOR06P, IFFACOR07T, IFFACOR07P

Month	Paper	Topic	No of classes
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September 2023 (25.09.2023)	IFFACOR05T	<b>Riverine and Coldwater Fisheries</b> Inland fish production in India- Riverine fisheries – major river systems in India, capture fisheries, fishing methods, problems encountered in fisheries development of major rivers.	5
October 2023	IFFACOR05T	Cold water fisheries- major rivers and uphill lakes and species – problems encountered and management in fisheries development of rivers and lakes supporting cold water fisheries.	5
	IFFACOR05P	Analysis of water quality (salinity, phosphate, nitrate).	6
	IFFACOR06T	<b>Biochemistry</b> General Introduction for importance of Biochemistry in Fisheries & Food Technology, Carbohydrates (Basic structure & classification, general features), Proteins (Basic structure & classification, general features) & Amino acids, Lipids (Basic structure & classification, general features), Enzymes (Classification, Mode of Action, Factors controlling enzymatic action, Michelis – Menten Equation)	10
	IFFACOR06P	Determination of sinking rate and water stability of feeds. Determination of proximate composition of feed Estimation of physical properties of feed: Bulk density, water absorption, expansion ratio, sinking velocity.	8
	IFFACOR07T	<b>Seafood Spoilage</b> Proximate composition of seafood. Spoilage pattern of seafood. Spoilage indices. Onboard handling of seafood. Importance of hygiene and sanitation in fish handling. Quality of water and ice in fish handling and processing. Different types of ice used in the seafood industry and their merits.	5
	IFFACOR07P	Determination of moisture content in fish and fishery products Calculation of ice for chilling fishes Filleting of fish	6
October 2023		<b>PUJA VACATION</b> (19.10.2023 to 15.11.2023)	
November 2023	IFFACOR05T	<b>Marine Fisheries- Demersal Resources</b> Major demersal resource groups- elasmobranchs, cephalopods, silver bellies, flat fishes, crabs, sciaenids, pomfrets, prawns, lobsters, molluscan resources. Methods of fishing. Fishery of mud banks.	10
	IFFACOR06P	Extraction & Analysis techniques of Carbohydrates, Proteins & Lipids.	4

	<b>IFFACOR07T</b>	<b>Common Seafood Preservation Techniques</b> Principles of smoking, drying and salting of fish, Traditional drying / curing methods. Different types of drying. Spoilage of dried products. Different types of smoking: Cold, hot smoking, electrostatic smoking. Spoilage of smoked products. Principle of fermentations: fermented products. Fundamental principles involved in chilling and freezing of fish and fishery products. Thermal processing (Cooking, Sous-vide, Canning), Principles involved in canning of fish.	<b>10</b>
	<b>IFFACOR07P</b>	<b>Drying of fish. Organoleptic analysis of canned product</b> Visit to Fish Processing center.	<b>4</b>
<b>1<sup>st</sup> Week of Dec 2023</b>	<b>IFFACOR07T</b>	<b>Retortable pouch processing. Spoilage of canned products.</b> Principles of freeze drying. AFD and its merits. Introduction to extrusion technology.	<b>3</b>
<b>3<sup>rd</sup> Week of Dec 2023</b>		<b>Internal Examination &amp; Class for Slow Learners</b>	
<b>January 2024</b>		<b>End Semester Examination</b>	
		<b>Total Classes</b>	<b>76</b>

**NAME OF TEACHER: AJANTA LAHIRI**

**PAPER ALLOTTED: IFFACOR05T, IFFACOR06T, IFFACOR07T, IFFACOR07P**

<b>Month</b>	<b>Paper</b>	<b>Topic</b>	<b>No of classes</b>
<b>September 2023</b> <b>(25.09.23)</b>	<b>IFFACOR05T</b>	<b>Major pelagic resource groups– sardines, mackerel, anchovies, ribbon fishes, tuna, Bombay duck, seer fishes. Methods of fishing.</b>	<b>4</b>
	<b>IFFACOR06T</b>	<b>Feed management</b> <b>Practical feeding in grow-out of fishes and shrimps. Feeding strategies - Feed ration, feed quantity estimation, feeding frequency and feeding methods (Check trays, demand feeders, automatic feeders, feed dispensers). Farm made feeds, factory made shrimp and fish feeds in India.</b>	<b>6</b>
<b>October 2023</b>	<b>IFFACOR05T</b>	<b>Marine Fisheries- Pelagic Resources</b> <b>Marine fishery resources in India- important fishing zones including Wadge bank, maritime states.</b>	<b>6</b>
	<b>IFFACOR06T</b>	<b>Feed storage: Hydro-stability of feed and their storage;</b>	<b>4</b>

		<b>Prevention of spoilage from rancidity, fungus and associated toxins.</b>	
	<b>IFFACOR07T</b>	<b>Non-thermal Food Processing Techniques, Storage and Packaging Principles and advantages of high pressure processing, Ultrasound food processing, Pulsed electric field processing, Pulsed light technology, microwave processing, Irradiation. Different types of cold storages. Functions of packing. Different types of packing materials.</b>	<b>10</b>
<b>October 2023</b>		<b>PUJA VACATION (19.10.2023 to 15.11.2023)</b>	
<b>November 2023</b>	<b>IFFACOR06T</b>	<b>Feed quality Feed energetics, feed conversion ratio, protein efficiency ratio, feed conversion efficiency, net protein utilization, specific growth rate, average weight gain, gross growth coefficient, average daily gain, survival rate. EAAl, chemical score, biological value. Physical properties of feed: Leaching, water stability, bulk density, water absorption, expansion ratio, sinking velocity. Aquafeed industries in India. Factors affecting digestibility. Quality standards.</b>	<b>10</b>
	<b>IFFACOR07P</b>	<b>Identification of traditional &amp; modern fishing gears – Using FAO catalogue Fishing accessories ( floats, ropes, sinkers, swivels, shackles, fishing rods) Identification of synthetic and natural fibres Different types of hooks and baits</b>	<b>10</b>
<b>3<sup>rd</sup> Week of Dec 2023</b>		<b>Internal Examination &amp; Class for Slow Learners</b>	
<b>January 2024</b>		<b>End Semester Examination</b>	
		<b>Total Classes</b>	<b>50</b>