

FISHERIES SCIENCE

POST GRADUATE DEGREE STANDARD

FISHERIES BIOLOGY AND FISH PRODUCTION

UNIT I

Systematics -Commercially important aquatic fauna and flora - marine plants, corals, crustaceans, molluscs, echinoderms, finfishes, turtles and marine mammals -Biochemical taxonomy - external morphology of finfish, shellfish and marine mammals -Anatomy of finfish, shrimps, crabs, bivalves, gastropods and cephalopods.

UNIT II

Fish biology - food and feeding habits - age and growth length / weight relationship - reproduction, maturation, breeding, spawning, fecundity, eggs and larvae and development - fish physiology, functions of different organ systems of finfish and shellfish.

UNIT III

Fisheries resources - important capture fisheries of the world, India, Tamil Nadu-Distribution, population dynamics, stock assessment, modelling, MSY, MEY -conservation of aquatic organisms - endangered aquatic animals and their conservation migration of fishes.

UNIT IV

Freshwater aquaculture - site selection - construction of fish farms -cultivable species, carp, tilapia, murrel, catfish, freshwater prawn - culture techniques, monoculture, composite fish culture, polyculture, ornamental fish culture and breeding techniques - pre-stocking and post/ stocking management- integrated fish farming - sewage -fed fish culture-water recirculation system - feeds, formulation, feeding methods-sampling - harvesting.

UNIT V

Coastal and mariculture - site selection - construction of fish farm -cultivable species, finfish, shellfish and seaweeds - culture techniques - cages and pens - Management of coastal aquacultural farms - sea ranching - shrimp feed formulation, feeding techniques.

UNIT VI

Modern trends in fishgenetics - hybridisation cryopreservation of fish gemetes - ploidy - genetic engineering - sex reversal - cloning - transgenic fish - parasites -bacterial, fungal and viral diseases - genetically and environmentally induced abnormalities - Prognosis and diagnosis - vaccine development - prophylactic measures.

UNIT VII

Broodstock management of finfish and shellfish - breeding techniques, induced breeding - shrimp hatchery management - carp hatchery management - larval feeds - culture of fishfood organisms - water quality management in hatcheries - nursery management - seed transport techniques.

UNIT VIII

Physico - chemical features of freshwater systems - animal relationships - ecosystems - niches, trophic levels and food chains - primary and secondary production in freshwater bodies. Physico-chemical characteristics of seawater - waves tides, currents, tsumamis, El Nino, monsoonal currents - nitrogen,

phosphorus and carbon cycles - upwelling TS-diagrams- bio and hydrogenic fractions of oceanic sediments - manganese nodules.

UNIT IX

Marine pollution - industrial, sewage, thermal, radioactivity - impact on aquatic fauna and flora - mangroves, distribution and conservation - energy from biomass, waves, tides and currents - OTEC- microbiology and wastewater treatment - bioleaching and composting - sludge, treatment and utilisation - production of fishfood organisms from wastewaters - coastal zone management.

UNIT X

Economics of fisheries production - economics of fish marketing, domestic and export -economic utilisation of fishery resources - fishery regulations - importance of cooperatives - fishermen associations, NGOs in fisheries development - types of primary and secondary data for statistical analysis for policy making - fisheries investment projects, finance and project planning - socio-economics of fisherfolk. Fisheries extension service for fisheries development - important fisheries development schemes and organisations - transfer of technology by suitable extension methods - effective communication with the target population of fisheries R & D - importance of training in fisheries development - training methods - trainers-training - follow-up programmes - entrepreneurship development.

PAPER -II

FISHING AND FISH PROCESSING TECHNOLOGY

UNIT I

Traditional crafts - mechanised boats - inboard and outboard engines - Design, construction - materials; Trawlers, purse seiners, long liners, shore seine, gill netter, etc., - Fish holds in different types of fishing crafts - care and maintenance of fishing vessels.

UNIT II

Types of fishing gears - Gear materials and fabrication - maintenance and operation-preservation of netting material; Gear accessories - floats, sinkers, buoys and anchors.

UNIT III

Types of diesel engines - Operation and maintenance; fish processing and electronic equipments; refrigeration and ice making - Refrigerated transport.

UNIT IV

Chart reading and fixing position; life saving devices; rules in fishing and cargo ships; fishing regulations of the sea.

UNIT V

Hygienic handling of fish catch - handling, grading and segregation of fish and freshness of fishes; Rigor Mortis - Types of spoilage of fishes - Drying methods, quality of salt cured products - smoke curing - Types of smoking.

UNIT VI

Methods of canning - Materials for canning; canning media-quality of canned products; types of freezing - Chemicals in freezing; freeze drying - glazing - thawing - blanching.

UNIT VII

Fishery biochemistry - Nutritive values of fish; biochemistry of fishery products; bioactive compounds of micro and macro organisms; enzymes, source and mode of action and uses - mechanisms of enzyme

actions; antioxidants, additives, stabilizers and emulsifiers, spoilage of fish and fishery products - influence of fish processing on microbes - microorganisms in fish toxicity - microbiological of quality control testing - microbial fermentation.

UNIT VIII

Types of fishery byproducts; chemistry and utilization and application of microwave technology in product development - preparation of value - added fisheryproducts - product development and popularisation.

UNIT IX

Organoleptic techniques; quality analysis of processed fishery products- water quality in fish processing - sanitation and waste disposal; personnel hygiene, quality control - ISO, ISI & FAO.

UNIT X

Types of packages and packing materials, Testing, legislation and labelling of packaging materials, Transport and handling devices.