FISHERIES SCIENCE

(DEGREE STANDARD)

SUBJECT CODE: 328

UNIT- I: FISH BIOLOGY, FISH PHYSIOLOGY & FISH GENETICS

Systematics – Binomial nomenclature: classification of elasmobranchs, teleost's, crustaceans, and molluscs; external morphology – morphometric – meristic and anatomy of finfish and shellfish, DNA bar coding –Karyo taxonomy, Food and feeding habits –Gastro somatic index length weight relationships – age and growth – reproductive strategies – breeding – maturation and spawning –Gonado- somatic index fecundity and development biology of commercially important finfish and shellfish – physiology – respiration, circulation, digestion, excretion, osmoregulation--reproductive physiology -endocrine glands and sex hormones. Fish genetics : Sex determination, hybridization, fish breeding techniques.- Chinese hatchery, cryopreservation of gametes.

UNIT- II: MARINE FISHERIES AND POPULATION DYNAMICS

Commercially important marine fisheries of world; India, shellfish, crustacean and seaweed resources of India; fish population dynamics – Vonbertalanfy'sgrowth equations- growth and mortality parameters – Maximum sustainable yield –Maximum economic yield- CPUE-Yield per recruit- fish stock assessment soft\wares - growth overfishing-recruitment overfishing -Closed season –mesh size regulation.

UNIT- III: AQUACULTURE, ORNAMENTAL FISH CULTURE AND FISH DISEASES

Site selection for fish culture – cultivable fishes for fresh water- Pond chemistry – Dissolved Oxygen – Alkalinity, Hardness aquaculture , fish feeds – Pond disinfection with lime -Water quality management, integrated fish farming – sewage – fed fish culture, brackish water aquaculture, - -Shrimp culture –– shrimp feed formulation – shrimp hatchery and nursery rearing- culture techniques of bivalves, Mari culture-candidate species for Mariculture, Open water cages –Ornamental fish culture – Live bearers-Egg layers- culture of Fish food organisms- aquarium keeping –Fish diseases – fish parasites-Bacterial and viral diseases-remedial measures.

UNIT-IV: LIMNOLOGY, AQUATIC ECOLOGY AND BIODIVERSITY, FISHERY OCEANOGRAPHY, AQUATIC POLLUTION, COASTAL ZONE MANAGEMENT

Physico – chemical characteristics of fresh water bodies; lentic and lotic systems, flora and fauna, classification of lakes based on origin, productivity & mixing of water; phytoplankton and zooplankton, nekton, benthos, Estimation of primary production; Components of aquatic ecosystems, food chain, energy flow, animal association; Ecological niches – lagoons, estuaries, mangroves, coral reefs, flood plains, wet lands-exotic species- endangered species, conservation of habitats Marine zones – physical properties of sea water –chemistry of sea water- waves, tides, currents, El -Nino, Ekmanspiral, upwelling; Aquatic pollution -BOD,COD, oxygen demanding waste, eutrophication-sewage pollution, red tide- oil pollution, pesticide pollution, thermal pollution, radioactive pollution- biological indicators of pollution; Application of GIS in aquatic resource identification- remote sensing for coastal management-CRZ - Environmental Impact Assessment.

UNIT- V: FISHERIES ECONOMICS, STATISTICS, FISHERIES MARKETING & FISHERIES EXTENSION

Theories of demand and supply, market equilibrium, production function in capture and culture fisheries, Economics of fishing and fish farming, fish marketing; marketing channel, export and import policies; mean, median, mode standard deviation, bar diagram, pie diagram, histogram, frequency polygon, primary and secondary data for statistical analysis, correlation co-efficient, linear regression; extension teaching methods and use of audiovisual aids in extension activities, individual group and mass contact methods.

UNIT - VI: FISHING GEAR TECHNOLOGY, FISHING CRAFT TECHNOLOGY& NAVIGATION AND SEAMANSHIP

Types of fishing gears – fishing gear materials and their properties– yarn numbering system –Fishing gear accessories, floats, sinkers, etc.-design and construction of gill nets longline, trawls and purse seine. Principles of hydrostatics , law of floatation – Archimedes principle – Simpson's rules Fishing craft materials – wood, steel, FRP- form co-efficients, TPC– ship's stability– state of equilibrium care and maintenance of

vessels; types of propeller and rudder; Principles of navigation and seamanship – chart reading and fixing positions- chart symbols Compass, GPS–EPIRB- Rules of road related to fishing vessels – navigational lights-International code flags-life saving devices- buoyage system, storm signals, distress signals.

UNIT – VII: REFRIGERATION AND EQUIPMENT ENGINEERING, MARINE ENGINES

Laws of thermodynamics-vapour compression refrigeration- vapour absorption refrigeration-Compressor, evaporator, condenser – Freezers – plate, blast, tunnel-refrigerated- coefficient of performance sea water systems; Types and functions – operation and maintenance of various processing equipments-types of diesel engines and their working principles – outboard engines.

UNIT – VIII: FISH IN NUTRITION, FISH PROCESSING TECHNOLOGY

Nutritional value of fish- protein, non -protein, nitrogen, lipid, minerals, micro and macro element, trace elements, other functional biomolecules in fishes. Freshness of fish and rigor mortis – mechanisms of fish spoilage – fish drying methods – principles of salting and salt curing methods – smoking of fishes. Canning materials – canning media – methods of canning – quality of canned fishery products. Spoilage of canned foods, types, causes and preventive measures-packaging materials for canned foods. Fish preservation by chilling and icing – preparation of ice-chemicals used in freezing – types of freezing changes during frozen storage– method of thawing. Microbiological and biochemical changes in freezing – packaging and transport of frozen fishery products – freeze drying.

UNIT- IX: FISH PACKAGING TECHNOLOGY, FISH PRODUCTS AND VALUE ADDITION

Packaging materials and their properties-packaging for retail sale and storage- retort pouch packing, vacuum packaging, active packaging, MAP. Fishery by products – Fish meal- fish oil- shrimp waste- chitin –chitosan-fish protein concentrate- fish hydrolysate-fish silage – fish maws, fish glue- gelatin-isinglass-utilization of seaweeds –agar agar – algin – carrageenan.

UNIT- X: MICROBIOLOGY OF FISH AND FISHERY PRODUCTS, QUALITY ASSURANCE OF FISH AND FISHERY PRODUCTS

Source and types of microorganisms in fish and fishery products-Indicators of microbiological quality of fish and fishery products-nutritive values of processed seafood. Quality dimensions of sea food-assessment of quality changes in fresh and iced fish and during processing- application of HACCP concept in quality assurance- Role of EIA and MPEDA in fish and fishery products- Certification system for fish and fishery products –sea food safety – authenticity – traceability.

Dated: 28.11.2017