51 FISHERIES TECHNOLOGY & ENGINEERING

Unit 1: Fishing Technology

Different types of craft and gear, their operation and their maintenance; Construction of fishing vessels; Deck layout and deck equipment of fishing vessels based on the fishing methodprincipal dimensions of a boat; Engine: characteristics, handling and maintenance; Power requirement, auxiliary machinery systems, diving underwater vehicles;Importance of shape of underwater hull, classification and description of hull forms based on shape and speed-length ratio; Theory of waves: Rolling, pitching and heaving; Wall sides formula; Resistance and motion: Wave and eddy creating resistance, fluid resistance; Powering of fishing vessels; Safety and stability aspects of fishing vessels;Design of different types of fishing gears;Conventional and current practice for the representation of fishing gear by scale drawing;Selectivity of fishing gears; Fish Aggregation devices (FADs): Objectives and types of FADs; Definition of bycatch, types of bycatch reduction devices and the principles of operation; Design and construction of FADs; Types of TEDs: soft and hard types, materials used for their construction and maintenance; Use of modern techniques and equipment for fish finding and capturing; Factors affecting fishing gear design, types, general structure of gear, characteristics of fishing vessel and accessories of trawl (bottom and mid water), purse seine, gill net, bag nets, lines and traps;Fishing gear testing: Full scale and model testing in flume tanks, methods of testing a fishing gear; The influence of design features on the overall economic performance of fishing gears; Basic principles of acoustic fish detection; Acoustic surveys, acoustic equipment used in fishing;Components of GPS, working, functions, important applications of GPS in fisheries; Identification of Potential Fishing Zones (PFZ); Participatory GIS in fishing systems, theme Maps; Navigation and seamanship; Introduction to sea safety: Safe navigation procedures for fishing vessels, distress signals; Weather warning signals and weather reporting system for fishing vessels; International conventions related to sea safety.

Unit 2: Fishing Harbour and Fleet Management

FAO classification of fishing vessels; Indigenous fishing boats of India: Fishing boats of maritime states of India, fishing boats used in the inlandand brackish waters, account of mechanized boats introduced in India; Personnel management, planning of fishing cruises; Fishing fleet capacity, fleet registration, fleet insurance, seaworthiness assessment, tonnage measurements; Statutory rules and regulations under MSA, classified societies, manning regulations and requirements; Regulations to prevent collisions at sea; Classification and functions of fishing harbour; Facilities – waterside and landside facilities, services and utilities provided, layout of a modern fishing harbour, stages in the planning of fishing harbours; Dredging; Economic evaluation on fishing harbour project; Dry docks and slipway; Fishing harbour management and maintenance.

Unit 3: Aquaculture engineering

Site selection for aquaculture;Surveying and leveling,earthwork calculations; Design of dykes, sluice, channels; Tide fed farms; Studies on water supply; Aquaculture in open systems:Design

of cages, rafts, pens, rakes, ropes etc.; Fluid mechanics, pumps, flow estimation and measurement; Aquaculture in ponds, raceways and tanks; Recirculating aquaculture system; Aeration, sterilization and disinfection of ponds, tanks and other impounding structures; Filtration; Aeration: efficiency of Aerators; Recirculation and reuse systems;. Designs of re-use systems; Engineering aspects of fish and shrimp hatchery;Farm machinery operation and maintenance;Pond sealing techniques; Automatic feeding system, feed dispensers and demand feeders;Design and construction of aquaculture system pond construction, water transportation system, pump houses,inlet and outlet structures,water treatment plants.

Unit 4: Refrigeration, Electrical & Equipment Engineering

Principles of refrigeration: Application of refrigeration in fisheries, refrigeration in sea food processing plant, refrigeration in factory trawlers,heat load calculations; Handling and operation of refrigeration equipment; General structure of electrical power systems; Principles and working, electronic components, principle and application of DC and AC networks, single phase AC circuits, three phase AC circuits, magnetic, transformers, induction motor, DC motors etc.; Principles of working of radio, radio telephone, radio direction finder, echo-sounder, sonar, radar, GPS etc.; Processing equipmenton board the fishing vessels; Fish meal plant equipment; Freeze drying and dehydrating equipment; Freezers and canning machineries;Packing machines;Equipment maintenance and safety.