ANDHRA PRADESH

RECRUITMENT OF ASSISTANT PROFESSORS IN THE UNIVERSITY

SYLLABUS FOR THE SCREENING TEST

MARINE BIOLOGY

SUBJECT CODE - 68

Section-A:

Basics of Marine Biology: Classification of the marine environment and primary biotic divisions; environmental conditions in relation to biotic divisions Classification of marine plankton; Deep-Sea - Life and environmental conditions; Marine Bio-deterioration - Fouling and boring organisms.

Marine Environment: Physical and chemical characteristics of marine environment; Biogeochemical cycles –Nitrogen, Phosphorous, Silicon cycle; Classification of flora and fauna in marine environment, Coral reef biome, deep sea system; Adaptations of the deep sea fauna; red tide phenomenon its causes and effects in sea.

Oceanography: Introduction to oceanography; Physical properties of seawater- submarine topography; temperature and its distribution, Salinity and distribution - Temperature-Salinity relationships; light in the sea; Chemical composition of seawater- Ionic composition of seawater, major and minor constituents, trace elements, their importance and distribution; Concept of chlorinity and salinity; Inorganic plant nutrients and fertility of the sea; Dissolved gases & Marine sediments- Carbon dioxide system in the sea; oxygen in the sea, hypoxia related issues in the marine environment; Origin and physical properties of marine sediments, classification of marine sediments; distribution and transport of sediments, granulometry; organic matter in the marine sediments; Ocean waves –tides; currents; thermo-haline circulation, Ekman Spiral, upwelling and sinking;

Biological Oceanography: Major upwelling areas in the world- Phytoplankton production and pelagic food web with reference to Indian ocean- Biological significance of upwelling; Adaptations of intertidal organisms-Rocky, Sandy and Muddy shores; Flora and fauna of estuaries; Mangroves, Seagrasses and saltmarshes-uses, need for conservation.

Section-B:

Marine Invertebrates-Characteristic features of invertebrates: classification up to order level - Protozoa, Porifera, Coelenterata, Annelida, Arthropoda, Crustacea, Mollusca and Echinodermata; Marine Vertebrates- Characteristic features and classification of bony fishes and Dipnoi fishes; Marine Reptiles and Birds-General characters and classification of reptiles, Aves, marine birds, migration, aerial adaptations of birds, importance of marine birds; Marine Mammals- Aquatic mammals, adaptations and evolution of Cetacea and Sirenia;

Fishery Science: General account of life history in Indian fishes: Seabass, cobia. Oil sardines, mackerel; Fishing Technology: Principal methods of exploitation of sea fishes - indigenous and modern craft and gear; types of boats used in India; maintenance of fishing boats and control of marine fouling; classification of fishing gears; materials used in different types of fishing gear; fishing hooks and baits; Endocrine systems and Osmoregulation: Physiology of Endocrine system - hormones, neurohormones, hormones of reproduction in fin fishes and shell fishes;

Biomolecules: Major biomolecules – Classification, structure and function - carbohydrates, proteins, amino acids, lipids and fatty acids and Nucleic acids.

Section-C:

Coastal Aquaculture: Culture practices - Traditional, extensive, semi - intensive and intensive; Culture systems- Monoculture and polyculture. Shrimp culture management – Pre-stocking, stocking and Post stocking management - water quality management, feed management. Best management Practices (BMP,s) in shrimp farming;

Shrimp Hatchery Management: Shrimp hatchery management, techniques of induced breeding, larval rearing, packing and transportation. Selection criteria for shrimp seed; seed quality rating;

Diseases and Health Management: Viral and Bacterial diseases in shrimp - causes, symptoms, prophylactic and therapeutic treatments. Nutritional deficiency diseases, environmental stress diseases. Role of Probiotics in diseases prevention. Disease diagnosis: Microbiological, immunological and molecular diagnosis methods of identification of different diseases in fin fish and shell fish;

Fish Nutrition and Feed Technology: Nutritional requirements, nutritive needs of fin fish and shell fish with special reference to shrimp, prawn; Feeding and shrimp production; water

quality and feeding rates; feeding devices; Feeding methods-manual, mechanical and automatic feeding; relationship between feeding and growth; Feed ration and feeding schedule; Check tray monitoring; Feed management in shrimp (*Penaeus monodon and P. vennamei)*; Supplementary feed and formulations; feed ingredients; water stability of feeds; use of attractants in feeds; feed additives; binders; processing of feeds;

Fish Preservation : Principles of preservation; Methods of preservation-canning, curing, Freezing - techniques of freezing, different types of freezers, changes during freezing and storage of fish; industrial methods of freezing fish and shellfish; problems in fish preservations; fish preservatives; Fish Byproducts : Methods of extraction of fish liver oil; processing of Fish meal, Fish Silage, fish sausages, Fish manure and guano; Chitosan, chitin pearl essence, Isinglass, Fish leather, Fish Caviar, Fish Macaroni;

Fish Genetic techniques: Principles of genetics, interactions and environmental influences, practical applications of genetics - hybridization of fishes, recent trends and techniques in hybridization, selective breeding, cross breeding, development of disease resistance and high quality new strains;

Ornamental fisheries: Importance of fresh water ornamental fish culture in India; ornamental fisheries –word scenario; Fresh water ornamental species-live bearers, egg layers; Breeding of ornamental fishes- maturation, spawning ,hatching, larval raring; Feeding-larval and adult feeds; Induced breeding in ornamental fishes; Biology of different marine ornamental fishes; methods of collection of marine ornamental fishes; transportation of live marine ornamental fishes-use of sedatives etc.; marine ornamental organisms.

Marine Biotechnology: Marine Bioactive Compounds and marine natural products. Isolation, purification and characterisation of Icosanoids and Briostatins.

Marine Microbiology: Marine Microbial Biodiversity. Isolation and identification of marine microorganisms from water, sediment and seafood samples.