

SYLLABUS FOR URET EXAMINATION-2017 [MARINE BIOLOGY]

Paper-I Research methodology-100 marks.

Unit-1:

Mathematics and Statistics: - Measures of central tendency:- mean, median and mode, standard deviation, condition of probability and independent random variable, elementary concept of binomial, poisson and normal distribution, their properties and uses. Testing of linear regression and correlation.

Unit-II:

Research Methodology in plankton studies:- Collection and preservation of phytoplankton, Quantitative analysis of phytoplankton, standing stock, measurement and estimation of biomass, estimation of biodiversity of plankton population, methods of estimation of marine primary productivity, primary productivity in the Bay of Bengal and the Arabian Sea.

Unit-III:

Research methodology in study of Benthos:- Method of collection of Rocky, Sandy and Muddy shore fauna-quadrant sampling, core sampling and net sampling, preservation of benthos, standing stock assessment of macrofauna and meiofauna, quantitative analysis of macro fauna and meiofauna, methods of estimation of secondary production. Regional difference in secondary production with special reference to the Bay of Bengal and the Arabian Sea.

Unit-IV:

Research methodology in Fisheries and aquaculture: - Methods of population size, estimation of pelagic and demersal fishes, collection, transportation and preservation of fish samples for biochemical and karyological studies. Induced breeding and its management, selection of craft and gears in marine fisheries. Methods of fish processing, methods of seed collection from natural environment, methods of packing and transportation of seed materials. Site selection for establishment of prawn hatcheries, Hatchery management.

Unit-V:

Collection and identification of fin fish and shell fish larvae and seeds: - Methods of collection of fin fish seeds from the riverine sources and their identification, packing and transportation. Methods of collection of post larvae of shell fishes from the estuarine, brackish water and marine sources and their identification, methods of packing and transportation to the cultureable areas. Site selection for establishment of a shrimp hatchery and its managements.

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P.G.Deptt. of Marine Science
Berhampur University, B.A.M.

Paper II Marine biology and fisheries - 100 marks. (marine Biology)

Unit-I:

Sea water as a biological medium, major division of marine environment. Light, temperature, salinity as ecological factors influencing the distribution of marine organisms. Classification of plankton based on their size, shape and mode of life cycle and habitat. Deep sea benthos and their adaptations. Distribution of sea weeds and their economic importance in India. Mangroves and their distribution along Indian coasts; economic importance and needs for their conservation.

Unit-II:

Habit and habitat of fishes, Basic anatomy of fishes, detail structure and function of gills, structure and function of swim bladder, food and feeding habit of pelagic and demersal fishes, Fish migration and factors affecting fish migration, Growth and age determination in fishes. Principles of fish tagging in fish population studies and their significance. Hydrography in relation to fishes. Major marine fisheries resources of Indian seas- sardine, mackerel, pomfrets and Hilsha fishery resources. The fisheries of Chilika Lake.

Unit-III:

Marine fisheries of the world, riverine, estuarine and marine fisheries resources of India. Status of capture fisheries from the Indian Seas, marine and estuarine fishery potential of Odisha coast. Over fishing, impact of climate change on marine fisheries, fisheries and pollution. Types of crafts and gears used in India, gear materials and methods of their maintenance, principles of fish handling, fish processing and value added products, fish marketing, role of cooperatives in fish marketing.

Unit-IV:

Scope and importance of aquaculture, status of freshwater, brackish water and marine culture in India, selection and culture of edible fishes such as Indian major carp and scampi culture. Culture of mugil cephalous, milk fish culture, oyster culture and status of crab culture in India. Culture of ornamental fishes and their marketing. Pen, cage and raft culture.

Unit-V:

Polymorphism in coelenterates, Types of coral reefs and their theories. Marine fouling and boring organisms and their economic importance, antifouling and antiboring treatments, potential fishing zone forecasting, CRZ and marine protected area identification and management. Coral reef mapping.

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BERHAMPUR UNIVERSITY

DEPARTMENT OF MARINE SCIENCES

SYLLABUS FOR URET EXAMINATION - 2017.
[OCEANOGRAPHY]

Paper Code	Paper Title
Paper-01	Research Methodology
Paper -02	Advances in Chemical, Geological and Physical Oceanography, Meteorology and Remote Sensing Applications in Oceanography

Paper-01 → 100 marks

Research Methodology

Unit I

Research methods in oceanography - field surveys - techniques and protocols followed in water sampling, methodology for estimation of salinity, dissolved oxygen, nutrients, particulate matter, principle of Atomic Absorption Spectrometry for identification of trace elements in sea water pre-treatment methods, preservations and analysis.

Unit II

Methods for measurement of surface weather parameters and the required instruments and their working principles. Preparation of Synoptic Chart for interpretation of weather conditions. Types of tide gauge and its working principle. Types of current meter and its working principle. Wave rider bouy and its working principle, Littoral Environmental Observation (LEO), Shoreline mapping through different methods/ Instruments.

Unit III

Research methods, techniques and protocols followed in surface and core sediment sampling, preservations and analysis. Field and laboratory equipments used in Marine Geology.

Unit IV

Mathematical modelling and statistical tools used for processing oceanographic data. Basics of advanced instrumentation required for remote sensing studies. Satellite data acquisition, In situ data collection using GPS/DGPS, Hyperspectral Underwater Radiometer, data validation, Classification Accuracy and Kappa statistics.

Unit V

Good practices in laboratory record keeping. Safety practices in geological and chemical laboratory, safety legislation. Disposal of chemical wastes, handling of hazardous gases and chemicals, fire safety and first aid.

Skills for problem identification, project preparation and design. Literature survey, scientific ethics and scientific manuscript preparation, data analysis and interpretation, thesis planning and writing.

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Advances in Chemical, Geological and Physical Oceanography, Meteorology and Remote Sensing Applications in Oceanography

Unit I

Chemical constituent of sea water and their equilibrium in the ocean. Factors affecting the distribution of trace elements in the sea and their significance, biogeochemical cycling of elements in the Ocean, Theory of CO₂ equilibrium in sea water, Distribution of CO₂ in the atmosphere and sea. Composition of interstitial water in marine sediments, Ocean pollution: heavy metal, radioactive waste and oil pollution.

Unit II

Geochemistry of deep sea sediments: Path ways and mode of incorporation of elements from sea water into sediment, Origin and distribution of Manganese-nodules from ocean floor, description and application of the modern techniques used to investigate Marine Geology, Gas hydrates, Glacio - isostasy and eustasy, Late quaternary sea level changes, Plate Tectonics and Sea Floor spreading.

Unit III


Coastal currents and circulation in and around Indian seas. East India Currents (EIC), Upwelling and Sinking in the Arabian Sea and Bay of Bengal, Indian Ocean Dipole (IOD), Ekman Spiral, Ekman Net transport and upwelling, Navier Stokes equations for viscous flows, Sverdrup and Munk's contributions for wind driven circulation, Laplace & Bernoulli's equations applicable to wave motion.

Unit IV

General circulation of the atmosphere and circulation models. Indian monsoon and its variability, Climate and its impact, Tropical cyclones, forces in the atmosphere, El-Nino and Southern Oscillation, Koppen and Thornthwaite's schemes of climatic classification. Predictability of monsoon - active and break cycles.

Unit V

Multispectral and Hyperspectral remote sensing principles, spectral signatures of minerals, rocks, soils, vegetation and water. Remote sensing Application to Coastal Zone Management; Passive Remote Sensing of ocean color and development of Bio-optical algorithm; Image classification methods.


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