



MANGALORE UNIVERSITY

DEPARTMENT OF MARINE GEOLOGY

MGH 502: OCEANOGRAPHY – II

Course Outcome:

- CO1: Students will be exposed to Geological Oceanography. Classification of coasts: Valentin’s Coastal Classification. Description of Beaches and palaeobeaches, Sea Stacks, Sea Caves and Notches.
- CO2: Attain knowledge of ocean floor morphology: Description of Continental shelf, slope, rise and abyssal plains. Explore oceans in search of living, minerals and fossil fuels as oceans cover more than two-thirds of the earth’s surface.
- CO3: Explain the relationship between plants and animals in the ocean and how they affect the cycling of matter and energy across the ocean, atmosphere and lithosphere.
- CO4: Summarize the major physical and chemical properties of seawater and how each affects marine life.

Geological Oceanography

Unit 1	Introduction to Geological Oceanography. Classification of coasts: Valentin’s Coastal Classification. Description of Beaches and palaeobeaches, Sea Stacks, Sea Caves and Notches. Ocean floor morphology: Description of Continental shelf, slope, rise and abyssal plains. Mid-oceanic ridge, Subduction zone and description of trenches, Ocean basins, Island arcs, Hot spots, Transform faults and Triple junction. Plate tectonics and Neotectonic processes.	8 hrs
Unit 2	Factors controlling the deposition and distribution of oceanic/marine sediments - Biogenous, Cosmogenous, Hydrogenous, Terrigenous and Authigenic. Tectonic evolution of the ocean basins. Reconstruction of monsoon variability by using marine proxy records. Opening and closing of ocean gateways and their effect on circulation and climate during the Cenozoic era. Sea-level change and methods to determine paleo-sea surface temperature.	8 hrs
Unit 3	Ocean-energy resources: Introduction, importance, general characteristics; Tidal energy-potential, harnessing, special features of tidal power plants in operation/under active consideration; the Indian scenario; Wave energy-potential. Special characteristics, the Indian scenario-potential, IIT-Madras wave energy programme “oscillating water column” chamber, Ocean Energy Thermal Conversion-Principle, factors affecting OTEC, special features, land-based/grazing types of plants.	6 hrs

Unit 4	Definition, characteristics, marine geological setting, genesis and occurrence of Metalliferous sediments, Phosphorites (including mineralogy and geochemical environments of modern deposition). Marine mineral resources:Importance, biotic and abiotic. Polymetallic nodules, Cobalt and other related crusts, Hydrothermal sulfide deposits including black and white smokers.	6 hrs
Unit 5	Placers: placer minerals, classification, environments of placer mineral deposition - rivers, beaches and offshore areas; Sand as a resource. Law of the Sea Treaty: Introduction, UNCLOS I, II and III, LOS Treaty – demarcation of various zones (Territorial Sea, Contiguous Zone, Exclusive Economic Zone, Legal Continental Shelf, High Sea, International Area of the Seabed), rights of coastal nations. International Seabed Authority.	6 hrs

Biological Oceanography

Unit 6	Introduction:Physico-chemical factors affecting marine life – light, temperature, salinity, pressure, nutrients, dissolved gases; adaptation and biological processes. Diversity index and its use in biological oceanography. Food-web. Case-I and Case-II water characteristics. Human impacts on marine communities; impacts of climate change on marine biodiversity. Impact of pollution on marine environments including fisheries.	6 hrs
Unit 7	Classification of the marine environment and marine organisms. Primary and secondary production; factors controlling phytoplankton and zooplankton abundance and its diversity. Plankton and harmful algal blooms. Nekton and introduction to fishery oceanography, benthos, coral reefs, foraminifera, diatoms, ostracods and <i>dinoflagellates</i> . Benthic organisms, coastal- marine communities. A glimpse of ecology – estuaries, coral reefs and mangrove, deep-sea including hydrothermal vent communities.	6 hrs
Unit 8	Outline of microbenthos, meiobenthos and macrobenthos in the ocean. Chlorophyll distribution in oceans. Sampling methods and introduction to Hyperspectral spectroradiometer, use of spectrophotometer. Secchi disc, D.O meter, Salinometer etc. Multiparametric Ocean probes to record salinity, temperature, chlorophyll, Dissolved oxygen.	6 hrs

List of References:

1. Pinet, P. R. (1992) Oceanography: An introduction to the Planet Oceanus, West Publ., Co. 571p.
2. Komar, P. D. (1976) Beach Processes and Sedimentation, Prentice-Hall. 429p.
3. Reddy M.P.M. (2001) Descriptive Physical Oceanography, AA Balkema Press. 440p.
4. Seibold, E. and Berger: The seafloor (1982).
5. Horne, R.A. (1969) Marine Geology; the structure of water and the chemistry of the hydrosphere.
6. R.A. Horne: Marine Chemistry (p.444) Carol M. Lalli and Timothy R. Parsons (1997) Biological Oceanography: An Introduction.
7. Miller, C.B. (2004) Biological Oceanography. Blackwell Publishers. 416pp.
8. **George Karleskint, Richard Turner, James Small, (2012) Introduction to Marine Biology Publisher: Brooks Cole, 512 p.**

