

ELECTIVES

20-319-0001 GENERAL OCEANOGRAPHY (ELECTIVE, Credit: 3)

After completion of the course the student will be able to:

1. Describe the spatial and temporal variability of physical properties of the ocean.
2. Sketch Ekman spiral.
3. Define upwelling area.
4. Explain different heat budget terms.
5. Describe Ocean circulations

Unit I

General introduction - dimension of oceans - geographical features - physical properties of sea water and its measurement - distribution of temperature, salinity, density and oxygen in space and time.

Unit II

Water masses: formation and classification - T-S diagram - water masses of the world ocean with special reference to Indian Ocean – Heat budget of ocean - insolation – long wave radiation – effect of clouds – sensible and latent heat transfer- Bowen's ratio.

Unit III

Circulation: general circulation of the atmosphere – trade winds – wind-driven and thermohaline circulation - major currents of the world oceans – seasonal currents in the Indian ocean - upwelling and sinking with special reference to the Indian Ocean. El-Nino and La-Nina.

References:

1. Descriptive Physical Oceanography: An Introduction: G.L.Pickard and W. J. Emery, Pergamon, Edns., 1982, 1992.
2. Descriptive Physical Oceanography, Reddy, M. P. M., 2000, New Delhi Oxford & IBH
3. Descriptive Physical Oceanography: An Introduction.Ed.6, Lynne D. Talley, George L. Pickard, William J. Emery and James H. Swift, Elsevier, 2011.
4. Introduction to Physical Oceanography: R. H. Stewart, E-book, 2005
5. The Oceans, their Physics, Chemistry and General Biology, H.U. Sverdrup, Prentice Hall, 1969.

Suggested Reading:

1. Elements of Physical Oceanography: A Derivative of the Encyclopedia of Ocean Sciences, Steele, John H, 2010, Academic Press.
2. Introduction to Physical Oceanography, Third edition, John A. Knauss and Newell Garfield, Waveland press, Inc., 2017
3. Ocean Currents: G. Neumann, Elsevier, 1st edn., 1968.
4. Oceanography: An Invitation to Marine Science, Garrison, Tom S., Brooks Cole, 2016
5. Physical Oceanography (Vol. 2), Defant, Albert, 1961, New York Pergamon Press.
6. Physical Oceanography, A.S.N. Murty and V.S.N. Murty, A.P.H. Pub, 2010, viii, 430 p.
7. Principles of Physical Oceanography: G. Neumann & WJ Pierson, Jr., Prentice Hall, 1st edn., 1966.
8. Oceanography Challenges to Future Earth, Komatsu, T., Ceccaldi, H., Yoshida, J., Prouzet, P., Henocque, Y. (Eds), Springer, ISBN 978-3-030-00137-7, 2019.
9. Ocean circulation in three dimensions, Barry A. Klinger and Thomas W.N. Haine, Cambridge University Press, 2019.