Programme: M. Sc. (Marine Sciences)
Course Code: MSO 362 **Title of the Course: Geophysical Fluid Dynamics Practical**
Number of Credits: 02
Effective from AY: June, 2018-19

Prerequisites for the course:	Physical Oceanography, with flexibility to those having interest to learn basics of fluid dynamics.	
Objective:	This is introduced to acquaint students with a hands-on-experience on what they learned in the theory. It involves field based observations and numerical techniques.	
Content:	**Module – I** 1. Kinematics analysis of wind and ocean current – Isotach and isogen analysis and construction of streamline patterns (10 hrs; Ref1) 2. Construction of trajectories of air parcels from successive synoptic charts (8 hrs; Ref1) 3. Computation of divergence and vorticity in horizontal flow (12 hrs; Ref2) **Module – II** 1. Construction of stream lines for simple types of flow (7 hrs; Ref2) 2. Field observations and analysis of Physical Oceanographic parameters of estuarine watersusing conductivity temperature and depth (CTD) instrument (15 hrs; Ref1,3) 3. Analysis of aerosol trajectory using HYSPLIT (HYbrid Single – Particle Lagrangian Integrated Trajectory) model. (8 hrs; Ref4)	24 hours 24 hours
Pedagogy:	This involves field observations (time series) and associated numerical techniques to differentiate different components of vector velocity.	
References/ Readings	1. Introduction to Physical Oceanography, 2008 – Robert H. Stewart, Department of Oceanography Texas , A&M University, Oceanworld.tamu.edu/resources/ocng_ textbook/PDF files/book.pdf 2. Guide to wave analysis and forecasting (2nd edition), 1998 - World Meteorological Organization (WMO- no 702) ISBN-92-63-12702-6, www.wmo.int/pages/prog/amp/mmop/documents/WMO%20No%20702/WMO702.pdf 3. Ocean Circulation and Climate (2nd Ed), 2013 - A 21st Century perspective eds. Siedler, G, Griffies, S, Gould .J, and Church, J, ISBN- 978-0-12-391851-2, Academic press. 4. HYSPLIT- Hybrid Single Particle Lagrangian integrated Trajectory Model, Air Resources Laboratory, http://www.arl.noaa.gov/ . NOAA technical memorandum ERL, ARL-224, Roland R. Draxler and Hess, G.D 5. The physics of marine atmosphere, 1965 – Roll, H.U., Academic Press, London. 6. Atmosphere – Ocean Dynamics, 1982 -- Gill, Adrian E, International Geophysics, 30 Academic press, New York.	
Learning Outcomes	Apply the knowledge gained to solve issues confronting the coastal regions specifically coastal dynamics leading to erosion.	