Programme: M. Sc. (Marine Sciences)
Course Code: MSC 165 **Title of the Course: Physical Oceanography Practical I**
Number of Credits: 01
Effective from AY: June, 2018-19

Prerequisites for the course:	Degree of Bachelor of Science of this University or an examination of any other University recognized as equivalent.	
Objective:	Develop skills of preparing graphs and estimate ocean/atmosphere properties that enable study of ocean/atmospheric phenomena.	
Content:	1. Analysis of vertical profiles of temperature, salinity and density to understand the physical processes in different regions at low, mid and high latitude of the world ocean (6hrs; Ref 1) 2. Analysis of vertical profiles of a) temperature, b)salinity and c) density in upwelling and non-upwelling regions of the world ocean (3hrs; Ref 1) 3. Generating vertical section of temperature to study the physical processes along a transect (6hrs; Ref 1, 2) 4. Generating vertical section of salinity to study the physical processes along a transect (6hrs; Ref 1, 2) 5. Generating vertical section of density to study the physical processes along a transect (6hrs; Ref 1, 2)	24 hours

	6. Estimation and analysis of heat content in different parts of World Ocean (3hrs; Ref 3, 4)	
Pedagogy:	Tutorials/assignments/practical/fieldstudy	
References/ Readings	1. Seawater: Its Composition, Properties and Behaviour, 1995 - Second Edition, Open University Press, 2. Ocean Circulation, 2001 - Second Edition, Open University Press, Walton Hall, Milton Keynes, MK76AA, UK 3. Algorithms for computation of fundamental properties of seawater, 1983. UNESCO TECHNICAL PAPERS IN MARINE SCIENCE, Endorsed by UNESCO/SCOR/ICES/IAPSO/ Joint Panel on Oceanographic Tables and Standards and SCOR Working Group 51, Unesco, Place de Fontenoy, 75700, Paris, France 4. Principles of physical oceanography, 1996 – Pierson, W.J. and Newmann, G.S., Prentice Hall Inc., New Jersey, U.S.A.. 5. Introduction to Dynamic Oceanography, 1983 - Pond, S. and Pickard, G.H., PergamonPress, U.K. 6. Tropical Pacific near-surface currents estimated from altimeter, wind, and drifter data. 1999 - Gary S. E. Lagerloef, Gary T. Mitchum, Roger B. Lukas, Pearn P. Niiler., Journal of Geophysical Research, Volume 104, Issue C10, pages 23313–23326. 7. Meteorology Today: An introduction to weather, climate and the environment (2^{nd} edition), 1985 - Ahrens, St. Paul, West Publ. House. 8. Meteorology-Understanding the atmosphere, 2012 - Steven A A	
Learning Outcomes	Explain processes responsible for behaviour of conservative properties of ocean. Understand the importance of sound in sea and know its implications for underwater communication. Know ocean processes along meridional section.	