Programme: M. Sc. (Marine Sciences)
Course Code: MSO 267 **Title of the Course: Analytical Chemistry of Sea water and**
Number of Credits: 02 **Instrumental Techniques Practical**
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:	1. The chemical analysis of water provides considerable insight into the health of oceans. 2. The analyses of trace metals in sea water helps in understanding of water's interactions with Earth's geologic materials, and given insight into the impact of human activities on water bodies. 3. The bulk analyses of metals in sediment gives information about the total metal content in a particular environment and it does not give information about the speciation. 4. The sequential extraction procedure described in this course provides an insight into the speciation of a particular element in an environment and their predominant form in the marine environment.	
Content:	**Module – I** 1. Pre concentration of sea water for estimation of dissolved trace metals by AAS technique. (8 hrs; Ref 1, 2, 3, 4) 2. Digestion of particulate matter for estimation of trace metals (6 hrs; Ref 5) 3. Estimation of dissolved and particulate Mn in seawater by Flame AAS method. (6 hrs; Ref 2, 3) 4. Estimation of dissolved and Particulate Co in seawater by Flame AAS method (5 hrs; Ref 2, 3) 5. Estimation of dissolved and particulate Fe in seawater by Flame AAS method (5 hrs; Ref 2, 3) **Module II** 1. Sediment digestion. (10 hrs; Ref 5) 2. Estimation of Mn in sediments by Flame AAS method. (5 hrs; Ref 2, 3, 4, 5) 3. Estimation of Co in sediments by Flame AAS method. (5 hrs; Ref 2, 3, 4, 5) 4. Estimation of Fe in sediments by Flame AAS method. (5 hrs; Ref 2, 3, 4, 5) 5. Speciation of metals in sediments (Exchangeable and carbonate bound metals) (5 hrs; Ref 5)	24 hours 24 hours
Pedagogy:	Lectures/ Demonstations/ Lab experiments.	
References/ Readings	1. Standard methods for the examination of water and waste water analysis (22nd edition), 2012. Rice, E.W and Bridgewater L. American Public health association, Washington DC. 2. Analytical chemistry of seawater, 1975 – Riley J. P. In Chemical Oceanography, J.P. Riley and G. Skirrow (eds.), Vol. 3, Academic Press, London. 3. Methods of Seawater analysis, 1983 – Grasshoff K., M. Ehrdardt and K. Krembling (eds.), Verlag Chemie, Weinneim, 419. 4. Manual for geochemical analysis of marine sediments and suspended particulate matter, 1977 – Loring, D. H. and Rantala, R. T. T., Fish. Mar. Serv. Dev. Technical Report 700.	
Learning Outcomes	1. The results of metal analyses of seawater samples are used to estimate the current levels of different trace metals in sea water. This would help in assessing the quality of water for sea life. 2. The results of speciation of metals in sediments give an insight into a particular metal and its association with different fractions of sediment components and this would help in un understanding the major form in which a particular metal is associated with a particular fraction of sediment.	