Course Type	Course Code	Name of the Course	L	T	P	Credits
DP	NESC504	Water and Wastewater Engineering Practical	0	0	3	1.5

Course Objectives

To enable students to perform experiments related to water and wastewater quality parameters.

Overall Learning Outcomes

Upon successful completion of this course, students will be able to:

- At the end of the experimental exercise, students will be able to perform field-oriented testing of water and wastewater.
- The student will also develop adequate skills for conducting Treatability studies of water and wastewater by various Unit Operations and Processes using laboratory scale models.

Unit No.	Topics to be covered	Practical Hr (P)	Learning outcomes
I	Calibration of pH meter, TDS meter, Conductivity meter, Nephelometer and determination of pH, TDS, Conductivity and turbidity of a given water and wastewater sample.	3	Understanding the operation and calibration of most common equipment's in field of water quality measurement.
II	Determination of acidity, alkalinity and hardness of a given water sample.	3	Understanding the measurement of acidity, alkalinity and hardness, and its role in water treatment.
III	Determination of nitrate of a given water/ wastewater sample.	3	Understanding the measurement of nitrate and its role in water quality management.
IV	Determination of sulphate of a given water sample.	3	Understanding the measurement of sulphate and its role in water quality management.
V	Determination of chloride of a given water sample.	3	Understanding the measurement of chloride and its role in water quality management.
VI	Determination of optimum coagulant dose using jar test.	3	Understanding the removal mechanism of colloidal particles from water source.
VII	Determination of mixed liquor suspended solids (MLSS), mixed liquor volatile suspended solids (MLVSS) and sludge volume index (SVI) of sludgesample.	3	To acquaint with microbial mass in ASP plant and the sludge settleability characteristics.
VIII	Determination of Chemical Oxygen Demand of a given wastewater sample.	3	To obtain the total organic matter in wastewater
IX	Determination of dissolved oxygen and Biochemical Oxygen Demand of a wastewater sample.	3	To familiarize with calculation of dissolved oxygen, and biodegradable organic matter.
X	Estimation of phosphate concentration in a given wastewater sample.	3	Understanding the measurement of phosphate and its role in water and wastewater quality management.
XI	Determination of Oil and grease in wastewater sample.	3	To get an idea about impact of oil and grease in waste water.
XII	Estimation Total Kjeldahl Nitrogen(TKN) and ammoniacal nitrogen concentration in a given wastewater sample.	3	To get exposure on determination of nitrogen content (organic and inorganic) in wastewater samples.
XIII	Practice & Review	6	To enhance the knowledge and assess the progress.
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Reference books:

1. Rice, E. W., Bridgewater, L., & American Public Health Association (Eds.). (2012). Standard methods for the examination of water and wastewater (Vol. 10). Washington, DC: American public health association.

2. CPCB guide manual for analysis of water and waste water, 2012, 1-186.