

Course title: Water quality monitoring methods and analysis				
Course code: WSW 145	No. of credits: 3	LTP distribution: 18-0-56	Learning hours: 74	
Pre-requisite course code and title (if any): None				
Department: Regional Water Studies				
Course coordinator(s): Prof. Arun Kansal		Course instructor(s): Prof. Arun Kansal		
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Course type: Compulsory Core		Course offered in: Semester 1		
Course description The course intends to prepare a student in acquiring skills on the art of water monitoring and quantitative analysis of critical water quality parameters. It also brings in those aspects of chemistry which are important for water quality management and pollution control.				
Course objectives				
1. To enable students to understand the principles and the practical approaches and techniques required to effectively monitor the chemical, hydrological and microbiological elements of water quality.				
2. To build understanding of water quality parameters and their relation to public health and environment.				
Course content				
Module	Topic	L	T	P
1	Introduction , sampling techniques, basic concept of quantitative techniques, instrument methods of analysis, standard solutions, water quality standards for different applications	7	0	0
2	Acidity and Alkalinity: Sources and nature, environmental significance, methods of measurement, Application of data	1	0	4
3	Hardness: General considerations; causes and source, environmental significance, methods of determination, application of data in environmental science	1	0	4
4	Chlorides: General considerations; causes and source, environmental significance, methods of determination, application of data in environmental science	1	0	4
5	Residual chlorine and chlorine demand: Chemistry of chlorination, methods of measurement	1	0	6
6	Dissolved oxygen: General considerations, environmental significance of dissolved oxygen, collection of samples for determination of dissolved oxygen, methods of Determination	1	0	4
7	BOD: General consideration, nature of BOD reaction, method of measurement, application of data	1	0	4
8	COD: General consideration, methods of measurement, application of data in environmental science	1	0	6
9	Sulphates, Nitrates and Phosphates: General considerations; causes and source, environmental significance, methods of determination, application of data in environmental science	1	0	6
10	Heavy metal- Iron and Manganese: General considerations, significance, method of determination, interpretation of the data for technologies for their removal	1	0	6
11	Jar test: Optimum coagulant dose estimation through turbidity measurement.	1	0	6

12	Bacteriological analysis: Plate count test for E-coli/MPN	1	0	6
		18	0	56
Evaluation criteria				
<ul style="list-style-type: none"> ▪ Major Practical exam 50% ▪ Viva 50% 				
Learning outcomes				
<ol style="list-style-type: none"> 1. Understand meaning of important parameters for measuring water quality; 2. Water quality criteria and standards, and their relation to public health, environment and urban water cycle; 3. Learn how to run accurate water quality tests and to determine how the parameters relate to each other; 4. Plan water quality surveillance for a given aquatic environment and to understand what a test result means in terms of the health of the ecosystem. 				
Pedagogical approach				
Classroom teaching, field work and laboratory work.				
Materials				
<ol style="list-style-type: none"> 1. Standard methods for the examination of water and wastewater published by APHA 15th ed. 2. Keith, L.H. [Ed.] 1988 Principles of Environmental Sampling. American Chemical Society 				
Additional information (if any)				
Student responsibilities				
The course has chemistry, laboratory experiments, and field visits. Opportunity to repeat laboratory experiments will be very limited and hence regular attendance is important.				

Course reviewers:

1. Prof Ram Karan Singh, Department of Civil Engineering, King Khalid University, Saudi Arabia.
2. Prof Narender Kanhe, Principal, Guru Nanak Institute of Engineering and Management, Nagpur.