KU4VACCHE102: WATER QUALITY ANALYSIS

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
4	VAC	100	**KU4VACCHE102**	3	45

Learning Approach (Hours/ Week)		Marks Distribution			Duration of ESE (Hours)
Lecture/ Tutorial	Practical/ Internship	CE	ESE	Total	
3	0	25	50	75	1.5

Course Description: The objective of this VAC course is to provide proficiency in various analytical methods used for water quality analysis. Identify and determine various contaminants in the water and to protect public health from water contamination.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	To understand the chemical composition of natural water.	U
2	Apply scientific knowledge to determine the presence of various contaminants in the water.	A
3	Analyze drinking water quality of the samples collected from the locality for assuring water quality to the society	An

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3	2	3	2	1	3	2
CO 2	3	2	3	2	1	3	2
CO 3	3	1	3	2	2	3	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**INTRODUCTION**	**6**
	1	National drinking water policy and standards – Definition and importance of water quality. Water contamination and Health risk. Waterborne disease. WHO Guidelines for drinking water quality	
2		**CHARACTERISTICS OF WATER**	**10**
	1	Sources of water – characteristics of water – Acidity, alkalinity, hardness, free chlorine, chlorine demand, calcium, magnesium, iron, manganese, zinc, ammonia, nitrate, sulfate and fluoride, DOC, BOD, COD and their importance.	
	2	Disadvantages of hard water – Softening methods – desalination of Brackish water: Distillation, Electrodialysis and reverse osmosis.	
3		**WATER QUALITY ANALYSIS- I**	**6**
	1	Theoretical principle of determination of total alkalinity of water, total hardness of the water sample, pH of ground and wastewater	
4		**WATER QUALITY ANALYSIS- II**	**14**
	1	Theoretical principle of determination of Dissolved oxygen of wastewater-Chemical oxygen demand of wastewater- salinity of the given water sample- turbidity of various water sample.	

	2	Detection and measurement of various contaminants using spectrophotometric method such as nitrate, chloride, fluoride, iron, micro-pollutants	
5	**TEACHER SPECIFIC MODULE- LABORATORY DEMONSTRATIONS**		**9**
	1	COD determination of water sample. - Turbidity of water sample. pH measurement of ground water Spectrophotometric determination of iron in drinking water.	

Essential Readings:

1. Environmental Chemistry, Anil K De.

2. Water Quality Concepts, Sampling, and Analyses-Y. Li, K. Migliaccio

3. Handbook of Methods in Environmental Studies, Vol.l Water and Wastewater Analysis-S. K. Mait

4. Water Chemistry, Mark M. Benjamin

5. Water Quality: Guidelines, Standards and Health, Stephen Pedley.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation (ESE)		**50**
Continuous Evaluation (CCA)		**25**
Theory (CCA)		25
a)	Test Paper*	10
b)	Assignment	5
c)	Seminar, Viva-Voce	10
Total		**75**

*Average of best two test papers