

Minutes of the meeting of Board of Studies in Chemistry of CMS College Kottayam (Autonomous) held at 2.00 PM on 12th June 2020 in Online mode (Link: <https://meet.google.com/lookup/fhqbreshhy>)

Members Present

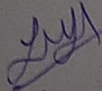
Sl.No	Name
1.	Prof. Ajitha Chandy
2.	Dr. Sheela Chacko
3.	Dr. Bessy AVarky
4.	Prof. Sumod M. John
5.	Prof. Shinu Peter
6.	Dr. Sheny D. S.
7.	Prof. Arun Abraham David
8.	Dr. VibinIpe Thomas
9.	Dr. Rony Rajan Paul
10.	Prof. Soumya Sasikumar
11.	Dr. Sunish K. S.
12.	Dr. Ajish K. R.
13.	Dr. Biju Joseph T.
14.	Dr. Gigi George
15.	Prof. Olive Abraham Chandy



The meeting commenced with a silent prayer followed by the welcome address by Prof. Ajitha Chandy (Chairman). Discussions based on the agenda were carried out. Sri. Shinu Peter mentions the importance of Water quality monitoring in and around our college. Dr. Bessy Varky suggested to conduct an add-on courses on Water quality monitoring. Committee seriously discuss the matter in detail and decided to conduct a separate value added course on Water quality monitoring. Committee decided to appoint Sri Shinu Peter to coordinate that course. The committee approved the following curriculum (attached) for that course.

The chairman thanked all the members for their cooperation and concluded the meeting at 4:00 pm.

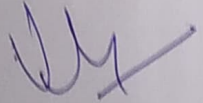
Read and confirmed



Sumod M John

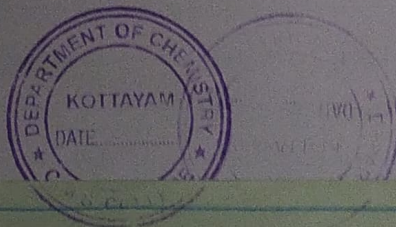
Chairman

12-06-2020



Vibin Ipe Thomas

Member Secretary



COURSE I: LEVEL I

Course	Details				
Code	CCCH01				
Title	Water quality monitoring				
Offered to	UG Students				
Branch	Chemistry				
Duration	Six Months				
Type	Certificate Course				
Credits	2	Hrs/Week	2	Total Hours	36

COURSE DESCRIPTION

This course enables the student to analyze the various physical, biological and chemical parameters of both ground and surface water as per the standard procedure put forward by World Health Organization.

COURSE OBJECTIVES

1. To create awareness about safe laboratory practices
2. To provide hands on experience on instruments like pH meter, conductivity meter, potentiometer, colorimeter, micropipette, centrifuge etc.
3. To impart theoretical knowledge and practical skills on analysis of ground and surface water

COURSE OUTCOMES

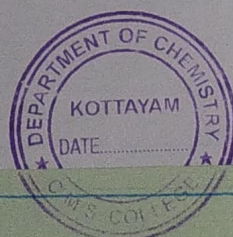
CO No.	Expected Course Outcomes	Cognitive Level
1	Manage issues related to lab safety	Ap
2	Understand the principle and theory behind various analytical	U



	methods	
3	Determine the authenticity of a physical parameters	Ap
4	Analyze real samples like water samples and food samples for finding adulteration	An

CONTENT: THEORY (18 Hours; Credit 1)

Module	Course Description	Hrs	CO.No.
1.0	Lab Safety	3	1,2
1.1	Laboratory hygiene and safety- storage and handling of chemicals.	1	1,2
1.2	Laboratory signs- Simple first aids: electric shocks, fire, cut glass, inhalation of poisonous gases, accidents due to acids and alkalies, burns due to phenol and bromine.	1	1,2
1.3	Disposal of sodium and broken mercury thermometer. Awareness of material safety data sheet (MSDS). Disposal of used chemicals. Good Laboratory Practices.	1	1,2
2.0	Sampling and Data Analysis	2	2,3,4
2.1	Sampling, evaluation of analytical data errors, accuracy and precision, methods of their expression, indeterminate errors.	1	2,3
	Various methods for the representation of data.	1	
3.0	Techniques and Instruments used in Chemical Analysis	2	2,3,4
3.1	Titrimetric and electroanalytical techniques used for water analysis. Introduction to the usage of micropipettes, centrifuge, pH meter, colorimeter etc.	1	2,3,4
4.0	Introduction to surface and ground water	5	
4.1	Hydrological cycle, quality of surface and ground water.	1	
4.2	Biology of natural water- plant algae, microflora, microbiology.	1	
4.3	Sources of contamination; Industry, Agriculture and household. Processes in nature and human activities in contaminating water. Pollution of fresh water, ground water and ocean. Effects of water pollution from various agents such as pesticides, detergents and inorganic pollutants.	1	
4.4	Waste water treatment techniques: Activated sludge process, Aerated	2	



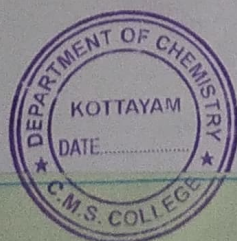
	lagoons, trickling filters, up flow anaerobic sludge blanket, disinfection, sludge treatment, tertiary and advanced waste water treatment-Industrial waste water treatment. Activated Carbon Adsorption (filtration by activated charcoal). Treatment with ion exchange resins, membrane techniques.		
5.0	Water quality parameters and standards	6	2,3,4
5.1	Classification of physical, chemical and biological parameters of water; Procedure for sample collection for various analysis. Significance of water quality parameters. Water quality standards- drinking, industrial, Irrigation	2	2,3,4
5.2	Measurement of water quality parameters: Odour, Colour, Electrical conductivity, Turbidity, Total dissolved solids (TDS), Salinity, Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), Dissolved oxygen (DO), Total microbes, pH, acidity, alkalinity, Hardness, Chloride content, iron content and total ammonia.	4	2,3,4

CONTENT: PRACTICAL (18 Hours; Credit 1)

Module	Course Description	Hrs	CO.No.
1.0	Sample collection for various analysis	2	4, 5
2.0	Determination Organoleptic & Physical Parameters: Colour, odour, pH, taste, turbidity and total dissolved solids.		
3.0	Determination of chemical parameters of water		
4.0	Determination of biological parameters of water		
5.0	Standard representations of a data by Origin/Microsoft Excel	2	4
6.0	Taking anthropogenic investigation of at least 2km of a stream or river on one side.		
7.0	Case study: Kuttanadu wetland		

References

1. Mendham, J., A. J. Vogel's Quantitative Chemical Analysis 6th Ed. Pearson, 2009.
2. Willard, H.H. Et al.: Instrumental Methods of Analysis, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.
3. Christian, G.D. Analytical Chemistry, 6th Ed. John Wiley & Sons, New York, 2004.
4. Harris, D.C.: Exploring Chemical Analysis, 9th Ed. New York, W.H. Freeman, 2016.
5. Khopkar, S.M. Basic Concepts of Analytical Chemistry, New Age International Publisher, 2009.
6. Skoog, D.A. Holler F.J. & Nieman, T.A. Principles of Instrumental Analysis, Cengage Learning India Ed.



7. Mikes, O. Laboratory Hand Book of Chromatographic & Allied Methods, Ellis Harwood Series on Analytical Chemistry, John Wiley & Sons, 1979.
8. Ditts, R.V. Analytical Chemistry; Methods of separation, van Nostrand, 1974.

Teaching Methodologies

- Class room learning through Power point presentation, smart classes, demonstrations etc.
- Outreach programme Based learning
- Peer Teaching
- Demonstration Methods for lab practices.
- Learning through Student Centric methods like Group discussions, Debate, Quiz etc.

Methods of Evaluation

75 % attendance is mandatory for appearing in any examinations. One industrial visit and Outreach programme is compulsory awarding the certificate in the mentioned course. For theory and practical a minimum of 40% marks is mandatory for the award of the certificate.

Sl.No.	Type	Marks
1.	Attendance	5
2.	Assignment/Viva/Seminar	10
3.	Written Test (Theory)	100
4.	Practical Test	100
5.	Institution Visit and Report Submission	50
6.	Outreach Programme	20
7.	Record	15
Total		300

Mark distribution of Attendance

Percentage	Mark
Above 90 %	5
Above 85%	4
Above 80%	3
Above 75%	2
75%	1
Below 75%	0

