

ENGINEERING CHEMISTRY LABORATORY			
Course Code	21CHEL16/26	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:2	SEE Marks	50
Credits	01	Exam Hours	3hrs
Course objectives:			
CLO1	Quantitative analysis of materials by volumetric and chemical method.		
CLO2	Instrumental methods for developing experimental skills in building technical competence		
Sl.N O	Instrumentation Experiments		
1	Estimation of FAS Potentiometrically using standard $K_2Cr_2O_7$ solution.		
2	Estimation of Acids in acid mixture Conductometrically.		
3	Determination of Viscosity coefficient of a given liquid using Ostwald's viscometer		
4	Estimation of copper Colorimetrically.		
5	Determination of pKa value of a given weak acid using pH meter		
	Volumetric experiments		
1	Estimation of Total hardness of water by EDTA complexometric method.		
2	Determination of Nickel using EDTA by complexometric method		
3	Determination of percentage of copper in brass using standard sodium thiosulphate solution.		
4	Determination of Chemical oxygen demand of industrial waste water.		
5	Estimation of percentage of iron in the given rust solution using standard Potassium Dichromate solution (External indicator method)		
	Demonstration Experiments (For CIE only)		
1	Estimation of Sodium & Potassium in the given sample of water using Flame Photometer.		
2	Synthesis of nanomaterial by Precipitation method.		
Course outcomes (Course Skill Set):			
At the end of the course the student will be able to:			
CO1	Determine the pKa and coefficient of Viscosity of a given organic liquid.		
CO2	Estimate the amount of substance present in the given solution using Potentiometer Conductometric and Colorimetric.		
CO3	Determine the total hardness and chemical oxygen demand in the given solution by volumetric analysis method		
CO4	Estimate the percentage of Nickel, copper and Iron in the given analyte solution by titration method.		
CO5	Demonstrate flame photometric estimation of sodium & potassium and the synthesis of nanomaterials by Precipitation method.		

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each course. The student has to secure not less than 35% (18 Marks out of 50) in the semester-end examination(SEE).

Continuous Internal Evaluation (CIE):

CIE marks for the practical course is **50 Marks**.

The split-up of CIE marks for record/ journal and test are in the ratio **60:40**.

- Each experiment to be evaluated for conduction with observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments designed by the faculty who is handling the laboratory session and is made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to 30 marks (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct 02 tests for 100 marks, the first test shall be conducted after the 8th week of the semester and the second test shall be conducted after the 14th week of the semester.
- In each test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability. Rubrics suggested in **Annexure-II of Regulation book**
- The average of 02 tests is scaled down to **20 marks** (40% of the maximum marks).

The Sum of scaled-down marks scored in the report write-up/journal and average marks of two tests is the total CIE marks scored by the student.

Suggested Learning Resources:**Text Books:**

- 1 Vogel's A.I. A text book of quantitative analysis, 35th edition, 2012.
- 2 Willard, Merit, Dean and Settle, A text book of Instrumental analysis, 6th edition 2012.

Reference books:

1. G.H Jeffery, J Bassett, J Mendham and R.C. Denney Vogel's A.I. A text book of quantitative analysis, Dorling Kindersley (India) Pvt., Ltd. 35th edition, 2012.
2. Gary D Christian, Analytical Chemistry, Wiley India, 6th edition, 2015.
3. T. Pradeep, A Text book of Nanoscience and Nanotechnology, McGraw Hill Education (India) Pvt., Ltd., 1st edition, 2015