



## **Part-B:**

### **14. Course Plan**

<b>Week</b>	<b>Topic</b>	<b>Teaching-Learning Strategy</b>	<b>Assessment Strategy</b>	<b>CLOs</b>
1	L-1: Objectives and scope of the study of analytical chemistry and its nature	Lecturing and Discussion	Quiz (Formative)	CLO1
	L-2: Typical quantitative analysis	Demonstration and Student Activity		
	L-3: Error in chemical analysis	Demonstration by Teacher;		
2	L-4: Accuracy and Precision	Lecturing, Discussion and Problem Based Learning	SFE (Summative)	CLO2
	L-5: Types of errors in experimental data;			
	L-6: Significant Figures and Rounding off			
3	L-7: Confidence intervals;		Class Test on Problem Solving (Formative)	CLO5
	L-8: Statistical test in hypothesis testing;			
	L-9: Analysis of variance;			
4	L-10: Detection of Gross Errors	Lecturing and Demonstration		CLO2 and CLO4
	L-11: Standardization and Calibration			
	L-12: Analytical samples and methods			
5	L-13: Figures of merit for analytical methods	Lecturing and Student Activity	Quiz	
	L-14: Review and Quiz	Group Discussion		
	L-15: Feedback on Quiz	Teacher' activity		
6	L-16: Gravimetric Methods of Analysis	Lecturing and Demonstration	Class Test and SFE Examination	CLO3
	L-17: Properties of precipitates and precipitating agents;			
	L-18: Application of gravimetric methods			
7	L-19: Titrimetric Methods: Indicators and End point	Lecturing and Problem Based Learning		CLO3
	L-20: Titration of strong acids and strong bases			
	L-21: Titration curves for weak acid and weak base			
8	L-22: Application of neutralization titration			CLO3
	L-23: Complexometric titration: Formation of			

	complex			
	L-24: Titrations with inorganic complexing agents	Lecturing and Group Discussion		
9	L-25: EDTA titration and its application		Class Test and Semester Final Examination (Summative)	
	L-26: Oxidation-reduction titration: End point detection	Demonstration by POGIL		
	L-27: Application of Redox titration			
10	L-28: Review on Titration	Discussion	Quiz (Formative)	
	L-29: Quiz/Class Test	Student Activity		
	L-30: Feedback on assessment	Discussion		
11	L-31: Electrochemical Methods: Nernst equation – effect of concentration	Demonstration and Flipped Learning Approach	Mid-Semester (Formative)	CLO3
	L-32: Potentiometry			
	L-33: Columetry			
12	L-34: Voltametry		Class Test and SFE (Summative)	CLO3
	L-35: Introduction to Spectrochemical Methods	Lecturing and Group Discussion		
	L-36: Deriving Beer's-Lambert Law	Student activity in class on Problem Based and Case-Base Study; Tutorial		
13	L-37: Ultraviolet and visible Molecular Absorption Spectroscopy:	Individual/Group Discussion		CLO3
	L-38: Atomic absorption spectroscopy			
	L-39: Review			
14	L-40: Presentation & Oral-1	Each student will present a different selected topic and would be asked question	Assignment and Oral Presentation	CLO1 to CLO7
	L-41: Presentation & Oral-2			
	L-42: Presentation & Oral-3			

### **Part-C**

#### **15. Assessment and Evaluation**

##### **(1) Assessment Strategy:**

Assessment will measure the achievement of learning outcomes. Assessment methods would be consisted with both formative and summative assessment. Students are required to attain all learning outcomes of the course. Summative assessment can be used to great effect in conjunction and alignment with formative assessment.

##### **(2) Marks distribution:**

- a) Continuous Assessment (Formative): 40%
- (i) Class Test/Quiz (Formative Assessment) 05
  - (ii) Assignment/Presentation 05
  - (iii) Class Attendance and Class Activity 05
  - (iv) Mid-Semester (Formative Assessment) 20
- b) Summative Assessment:60%
- Semester Final Examination 60

### Assessment Matrix of the Course

Course Learning Outcomes (CLOs)	Assessment				
	Mid-Semester (20%) (Formative Mode)	Final Examination (60%) (Summative Mode)	Attendance and Class Participation (5%)	Quiz/Class Test (10%) (Formative Mode)	Assignment and Presentation (5%)
CLO1:	Mid-Semester-1 (Formative Mode)	FEQ	Attendance and Class Activity	Quiz	Assignment & Presentation
CLO2	Mid-Semester-1	FEQ		Quiz/Class Test	Assignment & Presentation
CLO3	Mid-semester-2 (Formative Mode)	FEQ		Class Test	-
CLO4	-	FEQ		Quiz	-
CLO5	-	FEQ		Class Test	-
CLO6	-	FEQ		Class Test	-
CLO7	Assignment	-		-	-

#### (3) Make-up Procedures:

No make-up test will be arranged for a student who fails to appear in his/her in-course test/tests. Absence in any in-course test will be counted as zero for calculating the average in-course test for that course. However, a student can request special permission for re-take of in-course test if recommended by the course teacher through the academic committee of the Department only under extraordinary circumstances (e.g., accident, death of a close-relative, etc.)

<i>(f) Text Books</i>	
1.	Skoog, D. A., West, D. M., Holler, F.J., and Crouch, S. R. (2012): Fundamentals of Analytical Chemistry; <i>Cengage Learning</i> , India.
2.	Mendham, J., Dinney, R. C., Barnes, J.D., Thomas, M. and Sivasankar, B. (2009): <i>Vogel's Textbook of Quantitative Chemical Analysis</i> , 6 <sup>th</sup> Edition, <i>Pearson</i> , India.
<i>Reference Materials:</i>	
1.	Christian, D. (2007): Analytical Chemistry, 6 <sup>th</sup> Edition, <i>John Wiley &amp; Sons (Asia) Pte. Ltd.</i> , Singapore.
2.	Verma, R.M. : Analytical chemistry, 3 <sup>rd</sup> Edition, <i>CBS Publishers &amp; Distributors</i> , India
3.	Fifield, F.W. and Kealey, D.: Principles & Practice of Analytical Chemistry, <i>Wiley-Blackwell</i> , India