

<i>DEPARTMENT OF CHEMISTRY</i>				<i>CLASS: I. B.Sc. Botany</i>				
<b>SEM</b>	<b>Course type</b>	<b>Course code</b>	<b>Course Title</b>	<b>Credits</b>	<b>Contact Hours/week</b>	<b>CIA</b>	<b>Ext</b>	<b>Total</b>
<b>I</b>	<b>Allied Chemistry practical</b>	<b>20U1CAP1</b>	<b>Volumetric analysis</b>	<b>1</b>	<b>2</b>	<b>40</b>	<b>60</b>	<b>100</b>

**Nature of Course:**

Knowledge and Skill

Skill Oriented

Employability oriented

Entrepreneurship

**Course Objectives:** The objective of this course is to make the student

- (i) To demonstrate basic laboratory technique of volumetric analysis
- (ii) To develop the intellectual and psychomotor skills of the students by imparting knowledge in volumetric analysis
- (iii) To examine the quantitative estimation of acids, bases and inorganic compounds through volumetric techniques.

**LIST OF EXPERIMENTS**

1. Estimation of HCl by using standard Oxalic acid and link HCl (*Acidimetry*)
2. Estimation of NaOH by using standard Sodium carbonate and link HCl (*Alkalimetry*)
3. Estimation of Oxalic acid by using standard Ferrous ammonium sulphate (FAS) and link KMnO<sub>4</sub> (*Permanganometry*)
4. Estimation of FAS by using standard Ferrous ammonium sulphate and link KMnO<sub>4</sub> (*Permanganometry*)
5. Estimation of glycine using standard Oxalic acid and link NaOH.
6. Estimation of copper by iodometric method using standard dichromate and link thio solution (Demonstration only)

**Books for references :**

1. Dr. Chirag R. Fultariya & Dr. Jalpa P. Harsor, "Volumetric analysis: Concepts and Experiments", 1<sup>st</sup> edition, ISBN No. 9781365799303.
2. Vogel's text book of macro and semi-micro qualitative inorganic analysis, 5<sup>th</sup> edition.
3. O. P. Pandey, D. N. Bajpai, S. Giri, Practical Chemistry, ISBN: 9788121908122, Revised edition, S Chand & Co Ltd.

4. V. Venkateswaran , R. Veeraswamy, A.R. Kulandaivelu, Basic Principles of Practical Chemistry, S. Chand & Co., New Delhi,1997.

**Web resources:**

1. <https://byjus.com/chemistry/volumetric-analysis/>
2. <http://www.federica.unina.it/agraria/analytical-chemistry/volumetric-analysis/>

**Pedagogy :** Providing demonstration of given experiment

**Rationale for Nature of the course**

Volumetric analysis is a widely-used quantitative analytical method. As the name implies, this method involves the measurement of volume of a solution of known concentration which is used to determine the concentration of the analyte.

**Activities having direct bearing on Skill development/ Employability/Entrepreneurship**

The knowledge of Volumetric analysis develops the student's approach towards accurate measurement of concentration, molecular mass, purity percentage, formula of compounds and percentage composition of an element and stoichiometry of a chemical equation.

**Course outcomes: After successful completion of this course, the student will be able**

<b>CLOs</b>	<b>CLO statement</b>	<b>Knowledge level</b>
<b>CLO1</b>	To get domain knowledge in estimation of inorganic compounds	Up to K2
<b>CLO2</b>	To design the basic laboratory techniques of volumetric analysis	Up to K3
<b>CLO3</b>	To develop the skills for doing any titrations and recording data	Up to K3
<b>CLO4</b>	To make scientific claims that is supported by their data and other observations	Up to K4
<b>CLO5</b>	To communicate the finding	Up to K2

### PO and CLO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5
CLO1	3	2	-	-	-
CLO2	3	2	-	-	-
CLO3	3	2	-	-	-
CLO4	3	2	-	-	-
CLO5	3	2	2	2	-

### PLO and CLO Mapping (Department of Mathematics)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8
CLO1	1	1		1	1	-	-	-
CLO2	1	-		-	-	-	-	-
CLO3	1	-	1	-	-	1	-	-
CLO4	1	-		-	-		-	-
CLO5	1	-	1	-	-	1	-	-

3-Advance application;

2-Intermediate level;

1-Basic level

### PIO and CLO Mapping (Department of Physics)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
CLO1	1	-	1	1	-	1	-
CLO2	1	-	-	-	-	-	-
CLO3	1	1	1	2	-	1	-
CLO4	1	-	-	-	-	-	-
CLO5	1	1	1	2	-	1	-

3-Advance application;

2-Intermediate level;

1-Basic level

### Evaluation:

**Continuous Internal Assessment : 40 Marks**

**External Assessment : 60 Marks**

**Total : 100 Marks**

### Formative Assessment:

CIA Components	Marks
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Internal Test	20
Observation/Record	10
Continuous class assessment	10
<b>Total Marks</b>	<b>40</b>

**Summative Assessment:**

	<b>CLO statement</b>	<b>Knowledge level</b>	<b>Marks</b>
<b>CLO 1</b>	To get domain knowledge in estimation of inorganic compounds	Up to K2	10
<b>CLO 2</b>	To design the basic laboratory techniques of volumetric analysis	Up to K3	10
<b>CLO 3</b>	To develop the skills for doing any titrations and recording data	Up to K3	15
<b>CLO 4</b>	To make scientific claims that is supported by their data and other observations	Up to K4	20
<b>CLO 5</b>	To communicate the finding	Up to K2	5
<b>Total Marks</b>			<b>60</b>

**Name of the Course Designers**

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