HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Course Name: B. Sc. Chemistry Semester: V

PROGRAM CODE: SCIUG102
COURSE CODE: SC23MIDSCCHE502

Type of course: Minor Discipline Specific Course
Name of course: Simplified of Chemistry II (Minor-1)
Total Marks: 100

Effective from June 2025 Under NEP 2020

Total Credits: 04	Teaching Hours per Week: 04	Theory	External 50 Marks
	Teaching Hours per Semester: 60		Internal 50 Marks

Course Objectives:

1. To understand the core concepts of Corrosion.
2. To understand Organic chemistry concepts of Carbohydrate.
3. To know about the Colloidal State and preparation and application of Colloidalmaterials.
4. To know about the Colloidal State and preparation and application of Colloidalmaterials.

Course Outcome:

1. Students will have a firm foundation in the fundamentals and application of currentchemical and scientific theories including those in, inorganic and physical chemistry.
2. Students will appreciate the central role of chemistry in our society and use this as a basis for ethical behaviors in issues facing chemists including an understanding of safe handling of chemicals, environmental issues and key issues facing our society in energy, health and Medicine.
3. Students will be able to design and carry out scientific experiments as well as accuratelyrecord and analyse the results of such experiments.
4. Students will be skilled in problem solving approach, critical thinking and analytical reasoning as applied to scientific problems.
5. To know about the Volumetric titrations and calculations for estimation.

Unit	Topic	Credit	Hours
1	Water Technology • Introduction, • sources of water, • types of impurities in water, Physical impurities and Chemical impurities and Biological impurities • hardness of wate, temporary and permanent hardness, units of hardness, disadvantages of hard water In domestic use and In Industrial use. Estimation of hardness by EDTA method. • Determination of Alkalinity and Acidity of a water sample. Determination of the Chloride content in water • Treatment of water for domestic purpose. • Removal of suspended impurities. • Boiler troubles • Estimation of dissolved oxygen.	1	15

APT

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	• Softening methods: Internal treatment, external treatment; zeolite process, ion exchange process, desalination of brackish water - reverse osmosis.			
2	**Carbohydrate** • Carbohydrate Introduction of Disaccharides • Structure determination of Sucrose • Structure determination of Maltose • Structure determination of Lactose • Structure determination of Cellobiose	1	15	MAP
3A	**Surface Chemistry -Adsorption** • Adsorption by solids, • Chemisorption • applications of adsorption • Adsorption of gases by solids • Factors influencing adsorption • The frieundlich adsorption isotherm • The langmuir theory of adsorption • The BET theory of multilayer adsorption • Derivation of BET equation. • Types of adsorption isotherms. • Adsorption from solution - The Gibbs adsorption isotherm.	1	15	KPD
3B	**The Nernst Distribution Law** Nernst Distribution Law Thermodynamic derivation of Nernst Distribution Law Association of the solute in one of the solvents Dissociation of the solute in one of the solvents Solute enters into chemical combination with one of the solvents Applications of the Nernst distribution law Study of complex ions Solvent extraction			KPD
4	**Electro analytical techniques** **Potentiometry** • The scope of potentiometric titrations, Precipitation and neutralization titrations, Graphical method including Gran's plot for selecting end point, Differential titration, Dead stop titration, Ion selective Electrode, various types of Ion selective Electrodes and applications of Ion selective electrodes. **pH metry** • Introduction pH metry- types of indicator electrodes and reference electrodes. **Conductometry** • Introduction, Principle, determination of end point using Conductometric titrations. • Strong acid against strong base • Weak acid against strong base • Strong acid against weak base • Precipitation titrations (AgNO3 against KCl) • Application of Conductometric titrations. • Advantages and disadvantages of Conductometric titrations.	1	15	MRC

Books Suggested (Inorganic Chemistry):

1. Valance and molecular structure by Cartmell and Flower.
2. Text book of Inorganic Chemistry by Durent and Durent.
3. Inorganic Chemistry by S. Chand.
4. Advance Inorganic Chemistry Vol-II SatyaPrakash (S.Chand)
5. Concise Inorganic chemistry by J.D.Lee.
6. Metalic Corrosion By M.N. Desai
7. Advance Inorganic Chemistry J.E. Huhee.

(Organic Chemistry):

1. Analytical Chemistry: Gary D. Christian, 6th Edition; Wiley & Sons
2. Fundamentals of Analytical Chemistry: D. A. Skoog, D. M. West and F. J. Holler, 9thEdition, Cengage Learning.
3. Instrumental Methods of analysis: (CBS) H.H. Willard, L.L. Mirrit, J.A. Dean
4. Instrumental Methods of Inorganic Analysis: A.I. Vogel, ELBS
5. The principals of ion-selective electrodes and membrane transport: W.E.Morf Principlesof Instrumental Analysis: Douglas A. Skoog., F. James Holler, Stanley R. Crouch, Cengage Learning; 6th Edition.

(Physical Chemistry):

1. Advance Physical Chemistry by Gurdeepraj.
2. Physical Chemistry (Question and Answer) by R. N. Madan, G.D. Tuli,S. Chand.
3. Principal of Physical Chemistry by Puri, Sharma, Pathania.
4. Chemical Thermodynamics by R.P. Rastogi and R.R. Mishra.
5. Physical chemistry by atkins.
6. Essentials of Physical Chemistry by B. S. Bahal, ArunBahal, G.D.Tuli,
7. Physical Chemistry by P.W. Atkins, 5thedn, Oxford 1994 7th edn-2002.
8. Physical Chemistry by R.A. Albern and R.J.Silby, John Wiley 1995.
9. Physical Chemistry by G.H. Barrow, 5thedn, Mac Graw Hill, 1988,6thedn,1996.
10. Physical Chemistry by W.J. Moore, 4thedn, Orient Longmans 1969.

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Course Name: B. Sc. Chemistry

Semester: V

PROGRAM CODE: SCIUG102

COURSE CODE: SC23PMIDSCCHE502A

Type of course: Practical Minor Discipline Specific Course
Name of course: Practical's for simplified chemistry III (Minor-2)
Total Marks: 100

Effective from June 2025 Under NEP 2020

Group-A

Total Credits: 02	Teaching Hours per Week: 04	Practical's	External 25 Marks
	Teaching Hours per Semester: 60		
	Minimum No. of. Practical to be Performed: 09 (Twelve)		Internal 25 Marks

Group-B

Total Credits: 02	Teaching Hours per Week: 04	Practical's	External 25 Marks
	Teaching Hours per Semester: 60		
	Minimum No. of. Practical to be Performed:09 (Twelve)		Internal 25 Marks

Course Objectives:
1. To identify the organic, inorganic components.
2. Preparation of solutions and their standardization.

Course Outcome:
1. Students will gain a comprehensive knowledge and skills in standardization, hands on instruments and preparation of solutions for carrying out reactions.

Type	Topic
1	Inorganic Practicals(Any 5)
2	Organic Practicals (Any 04 Preparation & Any 03 Estimation)
3	Physical Practicals (Any 06)

Group	Practicals	Practicals	Marks
A	Inorganic-5	Organic -any 04(Preparation)	25
B	Physical-6	Organic - 03(Estimation)	25

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Sr. No	Topic	Credit	Hours
Group-A	**(1) Inorganic Quantitative analysis: (Minimum 05)**	1	30
	Water Analysis: (Any 04)		
	1. Determine amount of Carbonate, Bicarbonate, and pH		
	2. Determine amount of Calcium, Magnesium and Conductance		
	3. Determine amount of Sulphate, TDS and Conductance	1	30
	4. Determine amount of Chloride, TDS and pH		
	5. Determine amount of Total Hardness of water sample.		
	Colorimetry Estimation (Any 02)		
	1. Determine amount of Ni from Unknown Solution.		
	2. Determine amount of Cu from Unknown Solution.		
	3. Determine amount of Fe from Unknown Solution.		
	Paper Chromatography (Any 01)		
	1. Determine Rf value of Cu, Pb and Cd metals solution.		
	2. Determine Rf value of Co, Ni, Zn metals solutions		
	(2) Organic Preparations (Minimum 04)		
	1. Preparation of Schiff base (Benzylideneaniline from Aniline & Benzaldehyde) (Arthur I Vogel)		
	2. Preparation of Dibenzal acetone from Benzaldehyde and Acetone (Arthur I Vogel)		
	3. Preparation of Aniline from Acetanilide. (Green Chemistry method)		
	4. Preparation of Acetanilide from Aniline. 5) Preparation of m-Nitro aniline from m-Dinitrobenzene.		
	6. Preparation of Aspirin from Salicylic acid		
Group-B	**(1) Organic Estimation:**	1	30
	Estimation of functional groups (Any 03)		
	1. Estimation of Amide		
	2. Estimation of Ascorbic acid		
	3. Estimation of Aspirin		
	4. Estimation of Phenol		
	(2) Physical Practical: (Any 06)	1	30
	1. To study the adsorption of animal charcoal on acetic acid with different volume of acid.		
	2. To study the adsorption of animal charcoal on acetic acid with different contact time.		

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	3. To study the distribution of benzoic acid between water and benzene and determine the partition coefficient. 4. To Determine the Normality and Amount of given solution XN KI by Potentiometry titration using 0.1 N $KMnO_4$. 5. To Determine the Normality, amount and slandered oxidation potential of Fe^{+2}/ Fe^{+3} by potentiometric titration using 0.1N $K_2Cr_2O_7$. 6. To Determine the Normality and Amount of NH_4OH by PH metric titration using 0.1 N HCl. 7. To Determine the Normality and Amount of each base in given mixture of XN NaOH+NH_4OH by PH metric titration using 0.1 N HCl. 8. To Determine the Normality and Amount of XN NH_4OH by conductometric titration using 0.1 N HCl. 9. To Determine the Normality and Amount of each base in given mixture of XN NaOH+NH_4OH by conductometric titration using 0.1 N HCl.		

Reference Books:

1) Advanced Practical Physical Chemistry Practical, by J B Yadav
2) Organic practical Mann & Saunders
3) Vogel's Textbook of Quantitative Chemical Analysis
4) Elementary practical Organic Chemistry Arthur I Vogel
5) Practical Organic Chemistry Pragati prakhan
6) A Textbook of Qualitative Chemical Analysis (Arthur I Vogel)
7) Comprehensive Practical Organic Chemistry (Preparation & Quantitative Analysis)V.K. Ahluwalia, Renu Aggarwal

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