HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Course Name : **B. Sc. Chemistry** **Semester : II**

PROGRAM CODE : SCIUG102

COURSE CODE : SC23MDCCHE203

Type of course : Multidisciplinary course MDC

Name of course : General chemistry II

Effective from June 2023 Under NEP 2020

Total Credits : 02	Teaching Hours per Week: 02 Teaching Hours per Semester: 30	Theory	External 25 Marks Internal 25 Marks

Course Objectives:

1. To understand Thermodynamics as basis of general laws of sustainable equilibrium.
2. To know about the Volumetric titrations and calculations for estimation of various ions.

Course Outcomes:

1. Students will be able to explore new areas of research in both medicinal chemistry and allied fields of science and technology.
2. Students will appreciate the central role of chemistry in our society and use this as a basis for ethical behavior 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 explain why chemistry is an integral activity for addressing social, economic, and environmental problems.
4. Students will be able to function as a member of an interdisciplinary problem solving team.

Unit	Topic	Credit	Hr
1	**Thermodynamics** MRC Thermodynamics (only introduction) : System and surrounding- work & heat, state function, thermodynamic process, internal energy, enthalpy, free energy, maximum work function.	1	15

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	First law of thermodynamics heat capacity, specific and molar heat capacity, heat capacity at constant volume and pressure and their relationship, Work done in adiabatic and isothermal reversible expansion of an ideal gas. Second law of thermodynamics, Carnot cycle and its efficiency , Concept of entropy; entropy change for an ideal gas under different conditions, entropy change for mixture of ideal gases. Gibbs- Helmholtz equation, Vant hoff isochore equation, Vant hoff isotherm equation, Numerical.		
2	**(A) Introduction To Volumetric Analysis** APK Principle, Mechanism and Applications of Acid-Base Titrations (Only strong acid Vs strong Base), Redox Titrations (Only Fe(II) Vs $KMnO_4$), Complexo metric Titrations (Only Ca^{+2}/Mg^{+2}Vs EDTA), Precipitation Titrations (Only Vs $AgNO_3$), Related Numerical. **(B) Complexometric titrations** Introduction, EDTA :An important chelating Agents Types of EDTA titration metallochromic indicators, Factors Affecting on stability of complexes, masking and de masking, selectivity of titration construction of the titration curve.	1	15

Books Recommended:

Physical Chemistry

1. Advance Physical Chemistry by Gurdeep raj.
2. Physical Chemistry (Question and Answer) by R.N.Madan, G.D.Tuli..S.Chand.
3. Principal of Physical Chemistry by Puri Sharma, Pathania.

Chemical Thermodynamics by R.P.Rastogi and R.R.Misra.

Analytical Chemistry

1. Fundamentals of Analytical Chemistry by Skoos& West.
2. Analytical Chemistry, Garry D.Christain.
3. Analytical Chemistry, Day & Underwood.
4. Analytical Chemistry by Lerry&Hergins.
5. Qualitative Analysis by A.I.Vogel, 5thedn.

Further Reading:

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1. Reaction Mechanism and Reagents in Organic Chemistry, GurdeepR.Chatwal 4thedn, Himalaya Publication House.
2. Text book of Organic Chemistry, ArunBahal, S.Chand.
3. Organic Chemistry, R.Morrison and R.Boyd, 6thedn, Pearson Education 2003.
4. Organic Chemistry. T.W.GrahamSolomons, 4thedn. John Wilay. 1998.
5. Nuclear Chemistry by C.V.Shekhar, Dominent-Publisher. New Delhi.
6. Essentials of physical Chemistr by B.S.Bahal, ArunBahal. G. D.Tuli.
7. Physical Chemistry by P.W.Atkins. 5th edn.Oxferd 1994 7thedn-2002.
8. Physical Chemistry b R.A.Albert and RJ. Silby, John Wiley 1995.
9. Physical Chemistry by G.H.Barrow. 5thedn, Mac GrawHill . 1988. 6thedn. 1996.
10. Physical Chemistry by W.J.Moore. 4thedn. Orient Longmans 1969.

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Program Name : **B. Sc. Chemistry** **Semester : II**
PROGRAM CODE : SCIUG102
COURSE CODE : SC23PMDCCHE203

Type of course : Practicals Multi Disciplinary Course PMDC
Name of course : Practical's General chemistry II
Total Marks : 50

Effective from June 2023 Under NEP 2020

Total Credits : 02 Teaching Hours per Week: 04 Lab Teaching Hours per semester:60 Minimum number of practicals to be performed: 10	Practicals	External 25 Marks Internal 25 Marks

Course Objectives:

1. To identify the cationic and .anionic ions in mixture.
2. Preparation of solutions for volumetric solutions.

Course Outcomes:

1. Students will gain a comprehensive knowledge and skills in identification of cations and anions in inorganic mixtures.
2. Students will have basic knowledge of volumetric titrations.

Sr.No.	List of Practicals	Credit	Hr
1	**Inorganic Chemistry Semi micro Analysis: (Any six)** Cation analysis: separation and identification of ions from group I, II, III-A, III-B, IV, V-A, V-B. Anion analysis like (Water Soluble and insoluble). Candidate should perform the analysis of at least 08 compounds.	1	30
2	**Volumetric Titrations (Any four)** 1) To determine the strength of NaOH and Na_2CO_3 present in the solution mixture of NaOH & $Na_2CO_3$and to find out their percentage composition. 2) To determine the strength of $NaHCO_3$ and Na_2CO_3 present in the	1	30

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	solution mixture of $NaHCO_3$ & Na_2CO_3 and to find out their percentage composition. 3) To determine the Normality, gram/liter and molarities of $H_2C_2O_4$ $2H_2O$ and H_2SO_4 present in the solution mixture of $H_2C_2O_4$ $2H_2O$ and H_2SO_4 by using X N NaOH and Y N $KMnO_4$ solutions. 4) To determine the Normality, gram/liter and molarity of $H_2C_2O_4$ $2H_2O$ and $K_2C_2O_4$ present in the solution mixture of $H_2C_2O_4$ $2H_2O$ & $K_2C_2O_4$ by using X N NaOH and Y N $KMnO_4$ solutions. 5) To determine the amount of Ca^{+2} and Mg^{+2} ion by EDTA solution from the mixture solution of $CaCl_2$ and $MgCl_2$. 6) Calibration of burette Pipette and measuring flasks.		

Books Recommended:

1.Practical Chemistry : For B.Sc. I, II And III Year Students of All India Universities By Pandey O.P. & et Al. publisher S. Chand's, Paperback December 2010.

2.Basic Principles of Practical Chemistry,

by V. Venkateswaran (Author) publisher S. Chand's, Paperback – 1 January 2012

3. Chemistry In Laboratory-B.Sc.-Sem-I-Vi-Hons.

By Dr.Subhojit Ghosh (Author), Dr.Madhushree Das Sharma (Author), publisher CBCS, Paperback – 1 January 2019.

Further Reading:

1. Practical Chemistry, By Sonia Ratnani (Author), Swati Agrawal (Author), Sujeet Kumar Mishra (Author) publisger Mc Graw Hill, 1st Edition Paperback – 16 September 2020.

2. B.Sc. Practical Chemistry First Year By Paperback, Dr. M.M.N. Tandon, Publisher: Shiva Lal Agarwal & Company, 2020.