

BSc. sem VI
chemistry

CO-2 CO-3

NEP. 2020
start 2025-26

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Course Name: B. Sc. Chemistry Semester: VI

PROGRAM CODE: SCTUG102

COURSE CODE: SC23MJDSCCHE601

Type of course: Major Discipline Specific course

Name of course: Fundamentals of Chemistry IV (Major I)

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 Valency.
2. To understand physical chemistry concepts of Metal carbonyl compounds.
3. To know about the basic Concepts of Electrophilic and Free radical addition reactions.
4. To study about the Nucleophilic aromatic substitution reactions and applications.

Course Outcome:

1. Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in, inorganic and organic chemistry.
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 design and carry out scientific experiments as well as accurately record and analyse the results of such experiments.
4. Students will be skilled in problem solving approach, creative 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	Valency Variation method, Secular Equation, Stability of H_2^+ ion; M.O. approach, Stability of H_2 molecule; V. B. approach, Classical interaction energy Representation of wave function for SP , SP^2 and SP^3 hybrid orbitals, bond angle and bond strength M.O. treatment of OH molecules Quantum mechanical representation of Pauli's exclusion principle	1	15
2	Metal Carbonyl Introduction Classification: Mononuclear and Polynuclear Physical and Chemical Properties Metal Carbonyl (M-CO) bonding (On the basis of V.B.T. and	1	15

NEP

INT



Principal
The H.S.N.B. Ltd. Science College
Himatnagar-383001, S.K.

36

Head
Department of Chemistry
The H.N.S.B. Ltd. Science College
Himatnagar-383001

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Course Name: B. Sc. Chemistry Semester: VI

PROGRAM CODE: SCIUG102
COURSE CODE: SC23MJDSCCHE601A

Type of course: Major Discipline Specific Course

Name of course: Fundamentals of Chemistry V (Major-2)

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 chemical kinetics.
2. To understand physical chemistry concepts of photo chemistry.
3. To know about the chromatography.
4. To study about the infrared spectroscopy.

Course Outcome:

1. Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in, physical and analytical chemistry.
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 design and carry out scientific experiments as well as accurately record and analyse the results of such experiments.
4. Students will be skilled in problem solving approach, creative 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	<p>Chemical Kinetics:</p> <p>Effect of temperature on rate of reaction (Arrhenius equation)</p> <p>Concept of Activation energy</p> <p>Theories of reaction rate</p> <p>(1) Collision theory</p> <p>(2) Transition state theory</p> <p>Comparison of collision and transition state theory</p> <p>Theories of Unimolecular reaction</p> <p>Lindemann's theory</p> <p>Trimolecular reaction</p> <p>Trouton's Law</p> <p>Primary salt effect</p> <p>Secondary salt effect</p> <p>Numerical</p>	1	15



peu
Principal
The H.S.N.B. Ltd. Science College
Himatnagar-383001, S. G. 88

Chand
Head
Department of Chemistry
The HNSB. Ltd. Science College
Himatnagar-383001

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Course Name: B. Sc. Chemistry Semester: VI

PROGRAM CODE: SCIUG102

COURSE CODE: SC23PMJDSCCHE601B

Type of course: Practical Major Discipline Specific Course

Name of course: Practical's for Fundamentals of Chemistry III(Major-3)

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		Internal 25 Marks
	Minimum No. of. Practical to be Performed: 12 (Twelve)		

Group-B

Total Credits: 02	Teaching Hours per Week: 04	Practical's	External 25 Marks
	Teaching Hours per Semester: 60		Internal 25 Marks
	Minimum No. Of. Practical to be Performed:12 (Twelve)		

Type	Topic
1	In Organic Qualitative Practical (Any 08 Mixtures)
2	Organic Practical (Any 04 Estimation & Any 04 Preparation)
3	Physical Practical (Any 08)

Group	Practicals	Practicals	Marks
A	Inorganic Qualitative Practical (08)	Organic-04(Preparation)	25
B	Physical-08	Organic-04 (Estimation)	25

Course Objectives:

1. To prepare and estimated the organic components.
2. Preparation of solutions and their standardization.

Course Outcome:

1. Students will gain a comprehensive knowledge and skills in standardization and preparation of solutions for carrying out reactions.



[Signature]
Principal
The H.S.N.B. Ltd. Science College
Himatnagar-383001, S.K.

[Signature]
Head

Department of Chemistry
The HNSS, Ltd. Science College
Himatnagar-383001

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Course Name: B. Sc. Chemistry Semester: VI

PROGRAM CODE: SCIUG102
COURSE CODE: SC23MIDSCCHE602

Type of course: Minor Discipline Specific course
Name of course: Bioinorganic and Organic Chemistry

Total Marks: 100

Effective from June 2025 Under NEP 2020

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

Course Objectives:

1. To understand the core concepts of Bioinorganic chemistry.
2. To understand physical chemistry concepts of Active Methylene Group Compounds.
3. To Understand Tautomerism

Course Outcome:

1. Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in, inorganic and organic chemistry.
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 design and carry out scientific experiments as well as accurately record and analyse the results of such experiments.
4. Students will be skilled in problem solving approach, creative 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	Bioinorganic chemistry Introduction, Essential elements, Trace elements Metal porphyrine, Study of hemoglobin and myoglobin Nitrogen fixation: In Vivo and In Vitro	1	15
2	Active Methylene Group Compounds Introduction of Tautomerism Determination of keto-enol tautomerism Differences between Tautomerism and resonance Synthesis and application of Ethyl aceto acetate and malonic ester	1	15

SPV

MAP



peu
Principal
The H.S.N.B. Ltd. Science College
Himatnagar-383001, S.K.

44

Handwritten signature
Department of Chemistry
The HNSB. Ltd. Science College
Himatnagar-383001

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Course Name: B. Sc. Chemistry Semester: VI

PROGRAM CODE: SCIUG102

COURSE CODE: SC23PMIDSCCHE602A

Type of course: Practical Minor Discipline Specific Course

Name of course: Practical's for Fundamentals of Chemistry III

Total Marks:50

Effective from June 2025 Under NEP 2020

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

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 and Preparation of solutions for carrying out reactions.

Type	Topic
1	Inorganic Estimation Any 03
2	Organic -Preparation -Any 03
3	Physical-Any 03
4	Total 09


Principal
The H.S.N.B. Ltd. Science College
Himatnagar-383001, S.K.


Head
Department of Chemistry
The HNSB. Ltd. Science College
Himatnagar-383001



HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

Course Name: B. Sc. Chemistry Semester: VI

PROGRAM CODE: SCIUG102
COURSE CODE: SC23INTCHE607

Type of course: Internship
Name of course: Trainee Chemist
Total Marks: 100

Effective from June 2025 Under NEP 2020

Total Credits: 04	Internship Hours per Week: 36	Internship	External 50 Marks
	Internship Hours per Semester: 120		Internal 50 Marks

Course Objectives:

1. To understand working of a Industry and how Theoretical Knowledge is applied to industry.
2. Internship will improve the ability of candidate to apply core concepts of chemistry (organic, inorganic, physical, and analytical) in practical laboratory and industrial settings.

Course Outcome:

1. Technical Skills Development: Interns will acquire hands-on experience with modern instrumentation and laboratory techniques, including spectroscopy, chromatography, titrations, and synthesis.
2. Problem-Solving Abilities: Interns will enhance their skills in identifying, analysing, and solving chemical problems, both independently and as part of a team.
3. Safety and Ethics: Interns will understand and implement best practices in laboratory safety, environmental regulations, and ethical standards in chemical research and industry.
4. Communication Skills: Interns will improve their ability to document experiments accurately and communicate scientific findings clearly through written reports and oral presentations.
5. Professional Preparedness: Interns will gain insight into industrial workflows and research environments, enhancing their readiness for future employment or advanced study in chemistry-related fields.



[Signature]
Principal
The H.S.N.B. Ltd. Science College
Himatnagar-383001, S.K.

[Signature]
Head
Department of Chemistry
The HNSB. Ltd. Science College
Himatnagar-383001