SARDAR PATEL UNIVERSITY

B. Sc. (Chemistry) Semester - II

(Effective from Jun 2023)

Course Code (Major)	**US02MACHE01**	Title of the Course	**GENERAL CHEMISTRY- II**
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	To make students familiar with: 1. Some advanced topics of basic chemistry. 2. Historic development and scope of various branches of chemistry. 3. Basic concepts related to alkyl and aryl halides, bonding in inorganic compounds and fundamental aspects of chemical aspects.

Course Content		
Unit	Description	Weightage* (%)
1.	**ALKYL AND ARYL HALIDES** Homolytic and Heterolytic chemistry, Classification, Preparation, Reaction: Nucleophilic aliphatic substitution, S_N^2 Reaction: Mechanism, kinetics, stereochemistry, Reactivity & steric hindrance, S_N^1 Reaction: Mechanism, kinetics, stereochemistry, Carbocation, Structure of carbocation, Relative stability of carbocations, Stability of carbocation: polar effect, Rearrangement of carbocation, Reaction, Low reactivity of aryl and vinyl halides, Structure of aryl and vinyl halides, Nucleophilic aromatic substitution, Bimolecular displacement for nucleophilic aromatic substitution, Reactivity in nucleophilic aromatic substitution, Orientation in nucleophilic aromatic substitution, Electron withdrawal by resonance, Elimination-Addition mechanism, Benzynes, Problems.	**25%**
2.	**CHEMICAL BONDING** The Lewis Theory, Sidgwick-Powell Theory, Valance shell Electron pair Repulsion Theory (VSEPR), Effect of Lone Pair, Effect of electron negativity, Isoelectronic Principle, some examples using VSEPR Theory like BF_3 and the $[BF_4]$- ion, Ammonia NH_3, Water H_2O, Phosphorus pentachloride PCl_5, Chloride trifluoride ClF_3, Sulphur tetrafluoride SF_6, The triiodide ion I_3^-, Sulphur tetrafluoride SF_4, Iodine heptafluoride IF_7. LCAO method, s-s combination of orbitals, s-p combination of orbitals, p-p combination of orbitals, Rules of linear combination of atomic orbitals, Examples of molecular orbital Treatment for Homo	**25%**

	Nuclear Diatomic Molecules (B_2, C_2, N_2, F_2**).** Treatment for Hetero Nuclear Diatomic Molecules (CO^+, NO^+ CN^- and HF).	
3.	**[A] NOBLE GASES :** Electronic configuration, Physical properties, chemical properties, Compound formed under excited conditions, Clathrate compounds, Chemistry of xenon, Xenon fluoride preparation & properties, Structure and bonding in Xenon fluorides. **[B] FUNDAMENTAL CONCEPT OF COORDINATION CHEMISTRY** Definition of some terms, Classification of ligands, Chelate, chelating ligand and Chelation, Classification of chelates, Uses of Chelates, Co-ordination number and Stereochemistry of complexes, Nomenclature of co-ordination compounds.	**25%**
4.	**CHEMICAL KINETICS** Introduction, Concentration Effects, Differential Rate Laws, The Integrated Rate Laws, Experimental Determination of rate laws, Reaction Mechanisms, Elementary Processes, Mechanism and rate laws, Collision theory of Gaseous reactions, Temperature effects, Numerical Problems based on above topics.	**25%**

Teaching-Learning Methodology	Conventional method (classroom blackboard teaching), ICT. Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models).

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Learn about basic concepts of alkyl and aryl halides, co-ordination chemistry, chemical kinetics, d-block elements and chemical bonding. This learning will be helpful in understanding second and third year B.Sc. chemistry course.
2.	Gain knowledge of various electrophilic and nucleophilic reactions of aromatic compounds.
3.	Have knowledge of nomenclature of complexes and ligands.
4	To gain knowledge of d-block elements and various bonds in inorganic complexes.

Suggested References:	
Sr. No.	References
1.	Barrow, G. M., *Physical chemistry* (6^{th} Edition).
2.	Bahl, B.S., Tuli J. D., and Bahl, A, *Essentials of Physical Chemistry*.
3	Prakash S., Tuli, G. D., Basu, S. K., Madan R. D., *Advance inorganic chemistry* (Vol. - II).
4	Mahan, B.H. *University Chemistry*, 3^{rd} Edition Narosa.
5	Morrison, R. T. & Boyd, R. N., *Organic chemistry* (6^{th} edition).
6	Cotton, F.A. & Wilkinson, G. *Basic Inorganic Chemistry*, Wiley.
7	Lee J. D., *Concise Inorganic Chemistry* (4^{th} Edition).
8	Sharma K. K and Sharma L. K. *A Text Book of Physical chemistry*, (5^{th} Edition), Vikas Publishing House.
9	Selected Topics in Inorganic Chemistry, Wahid U. Malik, G. D. Tuli, R. D. Madan.

On-line resources to be used if available as reference material
On-line Resources : Google books, INFLIBNET, Google Web

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SARDAR PATEL UNIVERSITY

B. Sc. (Chemistry) Semester - II

(Effective from Jun 2023)

Course Code (Major)	**US2MACHE02 (Part-1)**	Title of the Course	**CHEMISTRY PRACTICAL - II**
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	To make students familiar with: 1. Chemistry as a subject. 2. Practical aspects of chemistry. 3. Basic concepts related to qualitative analysis of organic substance. 4. Hands on training on laboratory practices.

Course Content	
Practical	Description
Part-1.	**Identification of Organic substance**: Like organic spotting, detection of elements, Type of compound like aliphatic/aromatic, Nature (acidic/basic/neutral), Functional group(s) analysis, and m.pt. /b.pt. Benzoic acid, Salicylic acid, β-Naphthol, p-nitroaniline/m-nitroaniline, Acetanilide, Urea, Naphthalene, p-dichlorobenzene, m-dinitrobenzene, Dextrose, Acetone, Benzaldehyde, Methanol, Methyl acetate, Aniline.

Teaching-Learning Methodology	Hands on training, Practical Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (Power Point presentations, audio visual resources, e-resources, seminars, workshops, models).

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	--
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	--
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Learn about hands on training of Analysis of organic substances.
2.	Improve practical skills of students.

Suggested References:	
Sr. No.	References
1.	Mendham, J., Denney, R. C., Barnes, J. D., Thomas, M. J. K., *Vogel's textbook of quantitative chemical analysis*, 6th Edition.
2.	Pandey, O. P., Bajpai, D. N., Giri, S., *Practical Chemistry*.
3	Ghoshal, Mahapatra, Nad , *An Advanced course in Practical Chemistry*.

On-line resources to be used if available as reference material
On-line Resources: Google books, INFLIBNET, Google Web

(Bachelor of Science) (Undergraduate)
B. Sc. (UG) Semester - II
(Effective from Jun 2023)

Course Code (Major)	**US2MACHE02 (Part-2)**	Title of the Course	**CHEMISTRY PRACTICAL - II**
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	To make students familiar with: 1. Chemistry as a subject. 2. Practical aspects of chemistry. 3. Basic concepts related to volumetric analysis. 4. Hands on training on laboratory practices.

Course Content	
Practical	Description
Part-2	**TITRIMETRIC ANALYSIS (REDOX TITRATION)** (For the following exercise student has to prepare solution of titrant) (i) Titration of $KMnO_4 \rightarrow$ $FeSO_4(NH_4)_2.SO_4.6H_2O$ (ii) Titration of $K_2Cr_2O_7 \rightarrow FeSO_4.7H_2O$ using internal indicator diphenylamine sulphate. (iii) Titration of $KMnO_4 \rightarrow$ Oxalic acid (iv) Titration of $KMnO_4 \rightarrow$ $FeSO_4.7H_2O$ (v) Titration of $KMnO_4 \rightarrow$ Mixture of Oxalic acid and sodium oxalate (vi) Titration of $K_2Cr_2O_7 \rightarrow$ $FeSO_4(NH_4)_2.SO_4.6H_2O$ using internal indicator diphenylamine sulphate. (vii) Titration of $K_2Cr_2O_7 \rightarrow$ $FeSO_4(NH_4)_2.SO_4.6H_2O$ using external indicator Potassium ferrocyanide.

Teaching-Learning Methodology	Hands on training, Practical Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (Power Point presentations, audio visual resources, e-resources, seminars, workshops, models).

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	--
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	--
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Learn about hands on training of Volumetric analysis.
2.	Improve practical skills of students.

Suggested References:	
Sr. No.	References
1.	Mendham, J., Denney, R. C., Barnes, J. D., Thomas, M. J. K., *Vogel's textbook of quantitative chemical analysis*, 6th Edition.
2.	Pandey, O. P., Bajpai, D. N., Giri, S., *Practical Chemistry*.
3	Ghoshal, Mahapatra, Nad , *An Advanced course in Practical Chemistry*.

On-line resources to be used if available as reference material
On-line Resources: Google books, INFLIBNET, Google Web

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S SARDAR PATEL UNIVERSITY

B. Sc. (Chemistry) Semester - II

(Effective from Jun 2023)

Course Code (Minor)	**US02MICHE01**	Title of the Course	**BASIC CHEMISTRY- II**
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	To make students familiar with: 1. Some advanced topics of basic chemistry. 2. Historic development and scope of various branches of chemistry. 3. Basic concepts related to alkyl and aryl halides, and bonding in inorganic compounds.

Course Content		
Unit	Description	Weightage* (%)
1.	**ALKYL AND ARYL HALIDES** Homolytic and Heterolytic chemistry, Classification, Preparation, Reaction: Nucleophilic aliphatic substitution, S_N^2 Reaction: Mechanism, kinetics, stereochemistry, Reactivity & steric hindrance, S_N^1 Reaction: Mechanism, kinetics, stereochemistry, Carbocation, Structure of carbocation, Relative stability of carbocations, Stability of carbocation: polar effect, Rearrangement of carbocation, Reaction, Low reactivity of aryl and vinyl halides, Structure of aryl and vinyl halides, Nucleophilic aromatic substitution, Bimolecular displacement for nucleophilic aromatic substitution, Reactivity in nucleophilic aromatic substitution, Orientation in nucleophilic aromatic substitution, Electron withdrawal by resonance, Elimination-Addition mechanism, Benzynes, Problems.	**50%**
2.	**CHEMICAL BONDING** The Lewis Theory, Sidgwick-Powell Theory, Valance shell Electron pair Repulsion Theory (VSEPR), Effect of Lone Pair, Effect of electron negativity, Isoelectronic Principle, some examples using VSEPR Theory like BF_3 and the $[BF_4]$- ion, Ammonia NH_3, Water H_2O, Phosphorus pentachloride PCl_5, Chloride trifluoride ClF_3, Sulphur tetrafluoride SF_6, The triiodide ion I_3^-, Sulphur tetrafluoride SF_4, Iodine heptafluoride IF_7. LCAO method, s-s combination of orbitals, s-p combination of orbitals, p-p combination of orbitals, Rules of linear combination of	**50%**

	atomic orbitals, Examples of molecular orbital Treatment for Homo Nuclear Diatomic Molecules (B_2, C_2, N_2, F_2**).** Treatment for Hetero Nuclear Diatomic Molecules (CO^+, NO^+ CN^- and HF).	

Teaching-Learning Methodology	Conventional method (classroom blackboard teaching), ICT. Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models).

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	--
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	--
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Learn about basic concepts of alkyl and aryl halides, and chemical bonding. This learning will be helpful in understanding second and third year B.Sc. chemistry course.
2.	Gain knowledge of various electrophilic and nucleophilic reactions of aromatic compounds.

Suggested References:	
Sr. No.	References
1.	Morrison, R. T. & Boyd, R. N., *Organic chemistry* (6^{th} edition).
2.	Lee J. D., *Concise Inorganic Chemistry* (4^{th} Edition).

3	Prakash S., Tuli, G. D., Basu, S. K., Madan R. D., *Advance inorganic chemistry* (Vol. - II).
4	Cotton, F.A. & Wilkinson, G. *Basic Inorganic Chemistry*, Wiley.
5	Selected Topics in Inorganic Chemistry, Wahid U. Malik, G. D. Tuli, R. D. Madan.

On-line resources to be used if available as reference material
On-line Resources : Google books, INFLIBNET, Google Web

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SARDAR PATEL UNIVERSITY

B. Sc. (Chemistry) Semester - II

(Effective from Jun 2023)

Course Code (Minor)	**US02MICHE02**	Title of the Course	**CHEMISTRY PRACTICAL**
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	To make students familiar with: 1. Chemistry as a subject. 2. Practical aspects of chemistry. 3. Basic concepts related to qualitative analysis of organic substances. 4. Hands on training on laboratory practices.

Course Content	
Practical	Description
1	**Identification of Organic substance** : Like organic spotting, detection of elements, Type of compound like aliphatic/aromatic, Nature (acidic/basic/neutral), Functional group(s) analysis, and m.pt. /b.pt. Benzoic acid, Salicylic acid, β-Naphthol, p-nitroaniline/m-nitroaniline, Acetanilide, Urea, Naphthalene, p-dichlorobenzene, m-dinitrobenzene, Acetone, Benzaldehyde, Methanol, Methyl acetate, Aniline, Dextrose.

Teaching-Learning Methodology	Hands on training, Practical Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models).

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	--

2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	--
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Learn about hands on training of Analysis of organic substances.
2.	Improve practical skills of students.

Suggested References:	
Sr. No.	References
1.	Mendham, J., Denney, R. C., Barnes, J. D., Thomas, M. J. K., *Vogel's textbook of quantitative chemical analysis*, 6th Edition.
2.	Pandey, O. P., Bajpai, D. N., Giri, S., *Practical Chemistry*.
3	Ghoshal, Mahapatra, Nad , *An Advanced course in Practical Chemistry*.

On-line resources to be used if available as reference material
On-line Resources: Google books, INFLIBNET, Google Web

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SARDAR PATEL UNIVERSITY

B. Sc. (Chemistry) Semester - II

(Effective from Jun 2023)

Course Code (Multidisciplinary)	**US02MDCHE01**	Title of the Course	**ENVIRONMENTAL POLLUTION - II**
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	To make students familiar with: 1. Chemistry as a subject. 2. Basic concepts related to pollution and its effect on environment.

Course Content		
Unit	Description	Weightage* (%)
1.	**Soil Pollution** Introduction, Importance and formation of soil, Composition of soil, Salt affected to soil, Sources of soil pollution, Soil erosion and its types, Agents of soil erosion, Mechanism of soil erosion, Factors affecting to soil erosion, Detrimental effects of soil erosion, Measures of soil erosion, Preventing soil erosion, Chemical method of SEWAGE Treatment, Control of soil pollution, Sources using wastes.	**50%**
2.	**Radioactive Pollution** Introduction, How radioactive pollution differs from other pollution. Types and unit of radiation, Radiation chemistry, Interaction of ionizing radiation with matter, Principal Types of radiation, Chemical change, Effect of ionizing radiation on water and aqueous solution, Effect of radiation on organic compound, Auto radiolysis, Natural sources of radiation, Anthropogenic sources of radiation, Classification and effects of radiation, Effect of ionizing & non-ionizing radiation.	**50%**

Teaching-Learning Methodology	Conventional method (classroom blackboard teaching), ICT. Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models).

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	--
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	--
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Gain the knowledge of pollution chemistry using various fundamental aspects of chemical sciences.
2.	Understand types of pollutions and its effect on surrounding environment.
3.	To have knowledge of basic aspects of pollution chemistry.

Suggested References:	
Sr. No.	References
1.	Environmental studies by S.V.S. Rana Second reprint (F. Edi) : 2007.
2.	Environmental Chemistry by B. K. Sharma, H.KAUR, Third revised and enlarged edition -1996-97.

On-line resources to be used if available as reference material.
On-line Resources : Google books, INFLIBNET, Google Web

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SARDAR PATEL UNIVERSITY

B. Sc. (Chemistry) Semester - II

(Effective from Jun 2023)

Course Code (Multi Disciplinary)	**US02MDCHE02**	Title of the Course	**CHEMISTRY PRACTICAL**
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	To make students familiar with: 1. Chemistry as a subject. 2. Practical aspects of chemistry. 3. Basic concepts related to qualitative analysis of organic substances. 4. Hands on training on laboratory practices.

Course Content	
Practical	Description
1	**Identification of Organic substance:** Like organic spotting, detection of elements, Type of compound like aliphatic/aromatic, Nature (acidic/basic/neutral), Functional group(s) analysis, and m.pt. /b.pt. Benzoic acid, Salicylic acid, β-Naphthol, p-nitroaniline/m-nitroaniline, Acetanilide, Urea, Naphthalene, p-dichlorobenzene, m-dinitrobenzene, Dextrose, Acetone, Benzaldehyde, Methanol, Methyl acetate, Aniline.

Teaching-Learning Methodology	Hands on training, Practical Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models).

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	--

2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	--
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Learn about hands on training of Analysis of organic substances.
2.	Improve practical skills of students.

Suggested References:	
Sr. No.	References
1.	Mendham, J., Denney, R. C., Barnes, J. D., Thomas, M. J. K., *Vogel's textbook of quantitative chemical analysis*, 6th Edition.
2.	Pandey, O. P., Bajpai, D. N., Giri, S., *Practical Chemistry*.
3	Ghoshal, Mahapatra, Nad , *An Advanced course in Practical Chemistry*.

On-line resources to be used if available as reference material
On-line Resources: Google books, INFLIBNET, Google Web

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S SARDAR PATEL UNIVERSITY

B. Sc. (Chemistry) Semester - II

(Effective from Jun 2023)

Course Code (Inter Disciplinary)	**US02IDCHE01**	Title of the Course	**FUNDAMENTALS OF CHEMISTRY- II**
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	To make students familiar with: 1. Some advanced topics of basic chemistry. 2. Historic development and scope of various branches of chemistry. 3. Basic concepts related to d-Block elements, coordination chemistry and fundamental aspects of chemical kinetics.

Course Content		
Unit	Description	Weightage* (%)
1.	**[A] NOBLE GASES :** Electronic configuration, Physical properties, chemical properties, Compound formed under excited conditions, Clathrate compounds, Chemistry of xenon, Xenon fluoride preparation & properties, Structure and bonding in Xenon fluorides. **[B] FUNDAMENTAL CONCEPT OF COORDINATION CHEMISTRY** Definition of some terms, Classification of ligands, Chelate, chelating ligand and Chelation, Classification of chelates, Uses of Chelates, Co-ordination number and Stereochemistry of complexes, Nomenclature of co-ordination compounds.	**50%**
2.	**CHEMICAL KINETICS** Introduction, Concentration Effects, Differential Rate Laws, The Integrated Rate Laws, Experimental Determination of rate laws, Reaction Mechanisms, Elementary Processes, Mechanism and rate laws, Collision Theory of Gaseous Reactions, Temperature effects, Numerical Problems based on above topics.	**50%**

Teaching-Learning Methodology	Conventional method (classroom blackboard teaching), ICT. Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models).

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	--
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	--
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Learn about basic concepts of co-ordination chemistry, chemical kinetics, d-block elements. This learning will be helpful in understanding second and third year B.Sc. chemistry course.
2.	Have knowledge of nomenclature of complexes and ligands.
3.	To gain knowledge of d-block elements and various bonds in inorganic complexes.

Suggested References:	
Sr. No.	References
1.	Barrow, G. M., *Physical chemistry* (6^{th} Edition).
2.	Bahl, B.S., Tuli J. D., and Bahl, A, *Essentials of Physical Chemistry*.
3	Prakash S., Tuli, G. D., Basu, S. K., Madan R. D., *Advance inorganic chemistry* (Vol. - II).

4	Mahan, B.H. *University Chemistry*, 3rd Edition Narosa.
5	Selected Topics in Inorganic Chemistry, Wahid U. Malik, G. D. Tuli, R. D. Madan.
6	Cotton, F.A. & Wilkinson, G. *Basic Inorganic Chemistry*, Wiley.
7	Lee J. D., *Concise Inorganic Chemistry* (4th Edition).
8	Sharma K. K and Sharma L. K. *A Text Book of Physical chemistry*, (5th Edition), Vikas Publishing House.

On-line resources to be used if available as reference material
On-line Resources : Google books, INFLIBNET, Google Web

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SARDAR PATEL UNIVERSITY

B. Sc. (Chemistry) Semester - II

(Effective from Jun 2023)

Course Code (Inter Disciplinary)	**US02IDCHE02**	Title of the Course	**CHEMISTRY PRACTICAL**
Total Credits of the Course	2	Hours per Week	4

Course Objectives:	To make students familiar with: 1. Chemistry as a subject. 2. Practical aspects of chemistry. 3. Basic concepts related to qualitative analysis of organic substances. 4. Hands on training on laboratory practices.

Course Content	
Practical	Description
1.	**Identification of Organic substance** : Like organic spotting, detection of elements, Type of compound like aliphatic/aromatic, Nature (acidic/basic/neutral), Functional group(s) analysis, and m.pt. /b.pt. Benzoic acid, Salicylic acid, β-Naphthol, p-nitroaniline/m-nitroaniline, Acetanilide, Urea, Naphthalene, p-dichlorobenzene, m-dinitrobenzene, Dextrose, Acetone, Benzaldehyde, Methanol, Methyl acetate, Aniline.

Teaching-Learning Methodology	Hands on training, Practical Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models).

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	--

2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	--
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Learn about hands on training of Analysis of organic substances.
2.	Improve practical skills of students.

Suggested References:	
Sr. No.	References
1.	Mendham, J., Denney, R. C., Barnes, J. D., Thomas, M. J. K., *Vogel's textbook of quantitative chemical analysis*, 6th Edition.
2.	Pandey, O. P., Bajpai, D. N., Giri, S., *Practical Chemistry*.
3	Ghoshal, Mahapatra, Nad , *An Advanced course in Practical Chemistry*.

On-line resources to be used if available as reference material
On-line Resources: Google books, INFLIBNET, Google Web

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SARDAR PATEL UNIVERSITY

B. Sc. (Chemistry) Semester - II

(Effective from Jun 2023)

Course Code (Skill Enhancement Courses)	**US02SECHE01**	Title of the Course	**FUNDAMENTALS OF SOIL CHEMISTRY**
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	To make students familiar with: 1. Chemistry as a subject. 2. Fundamentals of soil chemistry.

Course Content		
Unit	Description	Weightage* (%)
1.	**Introduction to Soil Chemistry** Importance of soil, soil formation, composition of soil, the soil profile, types of soil, micro and macro plant nutrients. Soil fertility and productivity, techniques for the analysis of soil, soil reaction, determination of total nitrogen in soil, determination of phosphorus in soil, determination of potassium in soil by flame photometry.	**50%**
2.	**Analysis of Nutrients** Determination of total sulphur in soil, determination of calcium in soil determination of magnesium in soil, determination of lime and liming material in soil. Mechanical analysis of soil. Determination of total manganese in soil, determination of Fe (II) and Fe (III) in soil, determination of silica in soil, determination of soluble salts in soil, determination of sodium in soil by flame photometry.	**50%**

Teaching-Learning Methodology	Conventional method (classroom blackboard teaching), ICT. Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models).

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	--
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	--
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Gain the knowledge of soil Chemistry.
2.	Learn about analysis of micronutrients.

Suggested References:	
Sr. No.	References
1.	Environmental Chemistry: H. Kaur, Pragati Prakashan, 2nd Edition.
2.	Soils in our Environment: Raymond W. Miller, Duane T. Gardiner, Prentice Hall, 8th Edition.

On-line resources to be used if available as reference material
On-line Resources : Google books, INFLIBNET, Google Web

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