

GUJARAT UNIVERSITY
B.Sc. SEMESTER I
CHEMISTRY
EFFECTIVE FROM - JUNE 2023
ACCORDING TO NEP – 2020

Course Structure with respect to credit, hours and marks

Course Type	Course	Credit	Work Hours/ week	Exam Hours	Marks		Total mark
					Internal	External	
Skill Enhancement Course	SEC-116 Chemistry Laboratory Skills-I	2	3	2	25	25	50

N.B.: Each practical batch should have 10 students
No. of students per batch during practical exam = 10

SEC-116

Chemistry Laboratory Skills-I

Unit- I: Good laboratory Practices and safety guidelines: [15 hours]

[25 marks]

Basic principles of laboratory safety measures. Safe working procedure and protective environment, Classification of dangerous materials with pictorial symbols, common hazard materials, Safety in shelf storage of hazardous substances, Statutory provisions regarding fire safety. Classification of fires. Prevention of fire. Portable extinguishers. Foam extinguisher systems.

Methods of cleaning glasswares, Basics about chemical balance, volume measurement.

Difference between mixture and compound. Basic about chemical and physical change in chemical reactions.

Unit- II: Basic laboratory Practicals: [30 hours]

[25 marks]

Minimum 10 from the list

1. Identification and Recording Chemical Information of Lab chemicals
2. Separation and arrangement of Lab Chemicals
3. Proper use of the laboratory gas burner
4. Basic glass working
5. Cleaning of laboratory glasswares
6. Methods to Heat and Warm chemicals
7. Methods to Dry chemicals,
8. Methods to Filter chemicals,
9. Methods to Balancing of chemicals
10. Method to Volumetric Measurement of liquid sample

11. To Prepare a Mixture and Compound Using Iron Filings and Sulphur Powder
12. Perform the following experiments and classify them as physical or chemical changes:
 - a. Iron with copper sulphate solution in water
 - b. Burning of magnesium ribbon in air
 - c. Zinc with dilute sulphuric acid
 - d. Heating of copper sulphate crystals

REFERENCE BOOKS:

1. Vogel, Arthur I: A Test book of Quantitative Inorganic Analysis (Rev. by GH Jeffery and others) 5th Ed. The English Language Book Society of Longman
2. R.K.Jain and Sunil S.Rao. Industrial Safety. Health and Environment Management Systems, Khanna publishers, New Delhi.
3. Slote L. Handbook of Occupational Safety and Health, John Willey and Sons, New York
4. Frank P. Lees. Loss of prevention in Process Industries, Vol.1 and 2. Butterworth Heinemann Ltd.,London (1991).
5. Handbook of Environmental Health and Safety. Herman Koren and Michel Bisesi, Jaico Publishing House, New Delhi.
6. Handbook of Environmental Risk Assessment and Management: Peter Calow. Blackwell Science Ltd.USA
7. Risk Assessment and Environmental Management: D. Kofi Asvite-Dualy. John Willey & Sons. West Sussex, England.
8. Fire Equipment David L. Bever
9. NCERT Practical chemistry books
10. Fire Technology, R.S. Gupta
11. S.P. Singh, Selina ICSE Chemistry Practical book.

GUJARAT UNIVERSITY
B.Sc. SEMESTER II
CHEMISTRY
EFFECTIVE FROM - JUNE 2023
ACCORDING TO NEP – 2020

Course Structure with respect to credit, hours and marks

Course Type	Course	Credit	Work Hours/ week	Exam Hours	Marks		Total mark
					Internal	External	
Skill Enhancement Course	SEC-126 Chemistry Laboratory Skills-II	2	3	2	25	25	50

N.B.: Each practical batch should have 10 students
No. of students per batch during practical exam = 10

SEC-126

Chemistry Laboratory Skills-II

Learning Objectives:

- To be able to prepare various indicator.
- To be able to prepare litmus and other papers.
- To know how prepare reagent solutions.
- To know about preparation of various types of standard solutions.
- To know about the Standardization of solutions

Learning outcomes:

By the end of course, the students will be able to:

- Prepare different lab chemicals
- Prepare normal, molar and percentage solutions.
- Perform titrations

SEC-126

Chemistry Laboratory Skills-II

Unit- I: Preparation of solutions:**[25 marks]****[15 Hours]**

Definition, Calculation and theory related PPM solutions and Indicator.

Basic knowledge about Acids and Bases. Difference between true, colloid and suspension solution.

Types of Reactions like Combination reaction, Decomposition reaction, Displacement reaction and Double displacement reaction.

Unit- II: Basic laboratory Practicals:**[25 marks]****[30 Hours]-**

1. Preparation of litmus paper and other
2. Preparation of chemical reagent solutions
3. Preparation of Indicator
4. Preparation of PPM solutions
5. Finding the pH of the samples by using pH paper/universal indicator
6. Identification of acids and bases (HCl & NaOH) on the basis of their reaction with:
Litmus solution (Blue/Red), Zinc metal and Solid sodium carbonate, etc.
7. To prepare and identification of a true solution on the basis of transparency, filtration criterion, and stability.
8. To prepare and identification of a suspension on the basis of transparency, filtration criterion, and stability.
9. Perform and Identification of following experiment into :
 - a. Combination reaction i) Action of water on quicklime
 - b. Decomposition reaction ii) Action of heat on ferrous sulphate crystals
10. Perform and Identification of following experiment into :
 - a. Displacement reaction iii) Iron nails kept in copper sulphate solution
 - b. Double displacement reaction iv) Reaction between sodium sulphate and barium chloride solutions

REFERENCE BOOKS:

- 1.** Vogel, Arthur I: A Test book of Quantitative Inorganic Analysis (Rev. by GH Jeffery and others) 5th Ed. The English Language Book Society of Longman
- 2.** Harris, Daniel C, Quantitative Chemical Analysis, 3 rd Edition, W.H. Freeman and Company, New York, 2001.
- 3.** Analytical Chemistry Laboratory Manual By Birutė Staniškienė Ingrida Sinkevičienė, Kaunas, 2012.
- 4.** Khopkar, S.M. Basic Concepts of Analytical Chemistry New Age, International Publisher, 2009.
- 5.** Koogs, West and Holler, Fundamentals of Analytical Chemistry, 6 th Edition, Saunders College Publishing, New York. 1991
- 6.** NCERT Practical chemistry books
- 7.** S.P. Singh, Selina ICSE Chemistry Practical book