

BACHELOR OF SCIENCE  
Industrial Chemistry Vocational – Sardar Patel University  
Semester-IV  
SUBJECT CODE: US04CICV21  
TITLE: Fluid Mechanics and Heat Transfer  
(04 Credits, 4 Hours; 70 External Marks & 30 Internal Marks)  
(Effective from June 2019)

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UNIT-1:

Fluids and their Classification, Viscosity, Newtonian Fluids, Static pressure, Manometer, Mechanism of fluid flow, Types of flow, Continuity equation, Bernoulli's theorem, Friction factor and Friction head

UNIT-2:

Fluid moving machineries, Equipments, Pipes and pipe fittings, Pumps- classification and performance, Reciprocating and Rotary pumps, Centrifugal pumps, Blower, Compressors, Vacuum pump.

UNIT-3:

Modes of heat transfer, Fourier's law, Thermal conductivity, Thermal insulators, Steady state one dimensional heat conduction equation through plane wall, cylindrical wall, spherical wall and composite structure.

UNIT-4:

Heat transfer equipment, Types of heat exchanger, Shell and tube heat exchanger, Double pipe heat exchanger, Extended surface and Plate type heat exchanger.  
Evaporators: Batch and continuous type, Capacity of evaporators.

REFERENCE BOOKS:-

1. Introduction to Chemical Engineering, Walter.L.Badger and Juline.T.Banchero (Mcgraw Hill books).
2. Unit operations of Chemical Engineering, McCabe and Smith, (Mcgraw Hill books).
3. Unit operations (Volume I & II), (Nirali prakashan, Pune)
4. Chemical engineering (Volume I &II), J.M.Coulson & K.F.Richardson, (Asian Books pvt. Ltd, New Delhi)



# SARDAR PATEL UNIVERSITY

BACHELOR OF SCIENCE

Industrial Chemistry Vocational – Sardar Patel University

Semester-IV

SUBJECT CODE: US04CICV-22

TITLE: Basic Analytical Chemistry

(04 Credits, 4 Hours; 70 External Marks & 30 Internal Marks)

(Effective from June 2019)

Unit-1: Data Analysis: Analytical data evaluations: Errors, Accuracy and precision, Normal distribution curve, Mean and standard deviation, Comparison of results (students-t-test, f-test) paired t-test, Linear regression and correlation coefficient.

Unit-2: Titrimetric Methods of Chemical Analysis, General principle of titrimetry, Types of reactions in titrimetry, Standard solution, Basic requirements of titrimetry, Equivalence point and end point., Aqueous Acid Base Titrations. Concept of acid base titration, Titration curves, Acid-base indicators, Titration Feasibility and its applications., Non-aqueous Acid- base Titrations. Role and properties of solvents, Titrations in non-aqueous solvents.

Unit-3

Redox Titrations: Introduction, Redox systems, Redox potential, Nernst equation, Equilibrium constant, Titration curve & Feasibility, Redox indicators, Iodometric and iodimetric titrations., Complexometric Titrations: Introduction, Stability constant, Ways of detecting end point, Titration curves, Equilibrium involved in EDTA titration, Types of EDTA titrations, Titration of mixture; Selectivity, Masking and demasking, Metalochromic indicators, Applications.

Unit-4

Precipitation Titrations: Introduction, Feasibility and end point detection, Indicators, Volhard, Fajan and Mohr's methods, Factors affecting solubility of precipitates., Gravimetric Methods of Analysis: Principle of gravimetry, Requirements of precipitates, Formation and properties of precipitates, Coagulation & peptization, Co-precipitation and occlusion, Washing, drying and ignition of precipitates.

REFERENCE

BOOKS

1. Analytical Chemistry: Principles-by J.H.Kennedy, Saunders college publishers, 2<sup>nd</sup> edition, 1990
2. Introduction to Chemical Analysis-by R.D.Braun, Mc-Graw Hill Book Co. 2<sup>nd</sup> edition 1995
3. Vogel's Textbook of Quantitative Chemical Analysis- by G.H.Jeffory, J.Mendham, R.C.Denney, 5<sup>th</sup> edition, 1998
4. Analytical Chemistry-by G.D.Christian, Jhon Willey & Sons, 3<sup>rd</sup> edition,
5. Quantitative Analysis-by R.A.Day, Prantice hall of India(P) Ltd., New Delhi, 6<sup>th</sup> edition, 1993
6. Modern Analytical Chemistry, By David Harvey, Mc Graw-Hill (USA).
7. Principles of instrumental analysis-by D.A.Skoog & F.J.Holler & T.A.Nieman, Saunders college Publishers, 5<sup>th</sup> edition, 1998.

# SARDAR PATEL UNIVERSITY

BACHELOR OF SCIENCE  
Industrial Chemistry Vocational – Sardar Patel University  
Semester-IV

SUBJECT CODE: US04CICV **23** LABORATORY  
(04 Credits, 4 Hours; 50 External Marks)  
(Effective from June 2019)

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Experiments based on Fluid moving machineries and Modes of heat transfer. A demonstration of Heat transfer equipment.

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Semester-IV

SUBJECT CODE: US04CICV **23** - LABORATORY  
(04 Credits, 4 Hours; 50 External Marks)  
(Effective from June 2019)

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Preparation of various solutions, its standardization for the estimation of metals and organic compounds. Experiments based on gravimetric, Complexometric, Iodometry & Iodimetry methods. Analysis of inorganic substance by semi micro qualitative analysis. pH and conductometric titrations. Experiments based on an applications of Chromatographic techniques.