

Instrumental Techniques in chemistry

Class: M. Sc II

Skill level: 10

Department of Chemistry

1. Title: Instrumental Techniques in chemistry
2. Year of implementation: 2020

Structure of Skill Development Course

Level	Theory Hours	Practical Hours	Total Hours	Credits	No. of students in batch
10	20	30	50	03	30

Syllabus**Learning Objectives:**

1. To give the knowledge to the students about the all instruments.
2. To make the students knowledgeable about handling the instrument.
3. To improve the understanding of students regarding the working and their applications.

Theory Syllabus (20 Hrs)

Unit I: – UV Visible Spectroscopy and Infrared Spectroscopy (10)

Introduction, Principle, Instrumentation, practical demonstration on instruments, calibration and method development, spectroscopy instrumentation as well as data handling, analysis and reporting.

Unit – II – Atomic absorption Spectroscopy, Scanning Electron Microscope (SEM) and HPLC (10)
Introduction, Principle, Instrumentation, practical demonstration on instruments, calibration and method development, spectroscopy instrumentation as well as data handling, analysis and reporting.

Practical Syllabus (30 Hrs)

List of Experiments:-----

24 hr

- 1) To apply the beer Lambert relationship to an aqueous solution containing and absorbing substance and thus determine its respective concentration.
 - 2) Identification of functional group in the given organic compounds.
 - 3) Preparation of standard samples for analysis.
 - 4) Determination of Ca and Na by flame atomic spectroscopy.
 - 5) Determination of Mg and Fe by flame atomic spectroscopy.
 - 6) To apply the beer Lambert relationship to an aqueous solution containing and absorbing substance and thus determine its respective concentration in compound CuSO_4 .
 - 7) To apply the beer Lambert relationship to an aqueous solution containing and absorbing substance and thus determine its respective concentration in compound KMnO_4 and $\text{K}_2\text{Cr}_2\text{O}_7$.
 - 8) Identification of given organic compound using the fingerprint region.
- (Any relevant practical may be included.)

Project/ Field Visits/ Industrial Visit-----06 hr

Learning Outcomes:

- 1) The student should know identifying, quantifying and purifying the individual component of the mixture
- 2) The student should know size and morphology of the Nanoparticle in SEM.
- 3) The student should know study and identify chemical substance or functional group in solid, liquid or gaseous form.

Recommended Books:

- 1) Alka L.gupta ,analytical chemistry
- 2) Skoog,D.A.Holler F.J. and Nieman, T.A.Principle of instrumental analysis ,
cengage learning india Ed.
- 3) Willard, H.H., Merritt,L.L., Dean, J.&Settoe,F.A. Instrumental Methods of
analysis. 7th Ed. Wadsworth Pblishing Co.Ltd.Belmont,California,USA,1988

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