Course Content

Course Name: Analysis by Gas Chromatography

No. of weeks: 1 Week

Theory

- Introduction to gas chromatography
- Familiarize with the parts of the instrument & their working such as various types of columns, injector type, filter system and types of detectors
- Retention factor and method of internal standard
- Choosing appropriate column, temperature etc.

Practicals

- Actual practice of injection & handling of instrument
- Practice of separation of mixture of two components on column at constant temp by changing injection volume
- Analyse a mixture of three components at different parameters
- Practical on determining retention factor
- Creating calibration curve for unknown sample

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Course Name: Water Analysis

No. of weeks: 1 Week

Theory

- Sampling, precautions, directions for collecting samples of water,
- Principle of various instrumental techniques
- Understanding crucial parameters of water analysis such as colour, odour, turbidity, suspended solids, dissolved solids, conductance, and TDS (Total Dissolved Solids)
- Theory of hardness, the BOD and COD

Practicals

Determination of following physical and chemical parameters of water:

- pH
- Acidity
- Conductance
- Total & mineral acidity by using acidimetry
- Alkalinity total & alkalinity to phenolphthalein
- Temporary, permanent and total hardness of water

- BOD and DO

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Course Name: Spectrophotometric Method of Analysis

No. of weeks: 1 Week

Theory

- Awareness discussion on various methods of analysis such as traditional and instrumental method of analysis
- Status of spectrophotometry in the field of analysis
- Introduction, principle, absorption and emission spectrum molecular interaction Beer and Lambert's Law, instrumentation, industrial applications of polarimetry, colorimetry, spectrophotmetry, nephelometry, flame pholometry and flurometry

Practicals

- Preparation of solutions of various concentrations by using analytical balances.
- Preparation of various solutions for spectrophotometry like aqueous solutions dyes, metallic compounds.
- Preparation of calibration graph from known sample to determine the concentration of unknown sample

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Course Name: Quality Control in Industrial Chemical Analysis

No. of weeks: 1 Week

Theory

- Need of Quality Control in Chemical Laboratory. Standard solution and uses
- Types of error from measurement
- Role of statistics in quality control and relevant theory
- L-J control chart and it's applications
- Uncertainty in chemical analysis

Practicals

- Demonstration on care and use of analytical balances, errors in weighing, sampling procedure
- Practice of various calculations related to statistical quality control by using MS Excel.
- Prepare Gaussian Distribution curve of given data
- Exercise on identifying the errors as per L-J chart
- Calibration of the pipette

- Determination of uncertainty, combined uncertain and expanded uncertainty in chemical analysis

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Course Name: Industrial Chemical Analysis

No. of weeks: 1 Week

Theory

- Various laboratory test to analyze petrochemical, basic chemicals and specialty chemical
- Awareness Discussion on various methods of Analysis. Traditional methods and modern Instrumental techniques
- Introduction to quality control and its importance in chemical industry

Practicals

- Preparation of solutions of various concentrations by using analytical balances.
- Determine boiling point and melting point of given sample
- Determine iron content in given sample by UV-Vis spectrophotometer
- Determine the strength of NH_3
- Determine Total & Mineral acidity by using acidimetry
- To determine the percentage of Na_2CO_3 and NaOH in a mixture by titration against a Standard strong acid by two indicators

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Course Name: Process Safety Management

No. of weeks: 1 Week

Theory

- Need of Process Safety Management (PSM), process technology, origin and goal
- Process safety information and developing the PSM plan
- Manage Operations (Standard Operating Procedures and Safe Work Practices)
- Total employee Participation in PSM
- Mechanical Integrity and Quality Assurance, Management of Change
- Accident investigation, Emergency Response and Trade Secrets.

Practicals

- Assignment on Process Hazard Analysis (PHA)
- Practice of PSM auditing/review
- Determining risk of given process
- Exercise on Process Safety Information and MSDS