CH 2252 Instrumental Methods of Analysis

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Introduction to the Course

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Introduction

- This course is about the measurement of chemical systems using instruments.
- Each type of instrument has a unique set of strengths and weaknesses that makes it suitable for some measurements but not others.
- Some techniques are best for qualitative determinations and others are best for quantification.
- During this course, you should develop an understanding of these advantages and disadvantages and ultimately be able to suggest suitable instrumental methods for particular problems.

Analytical Chemistry

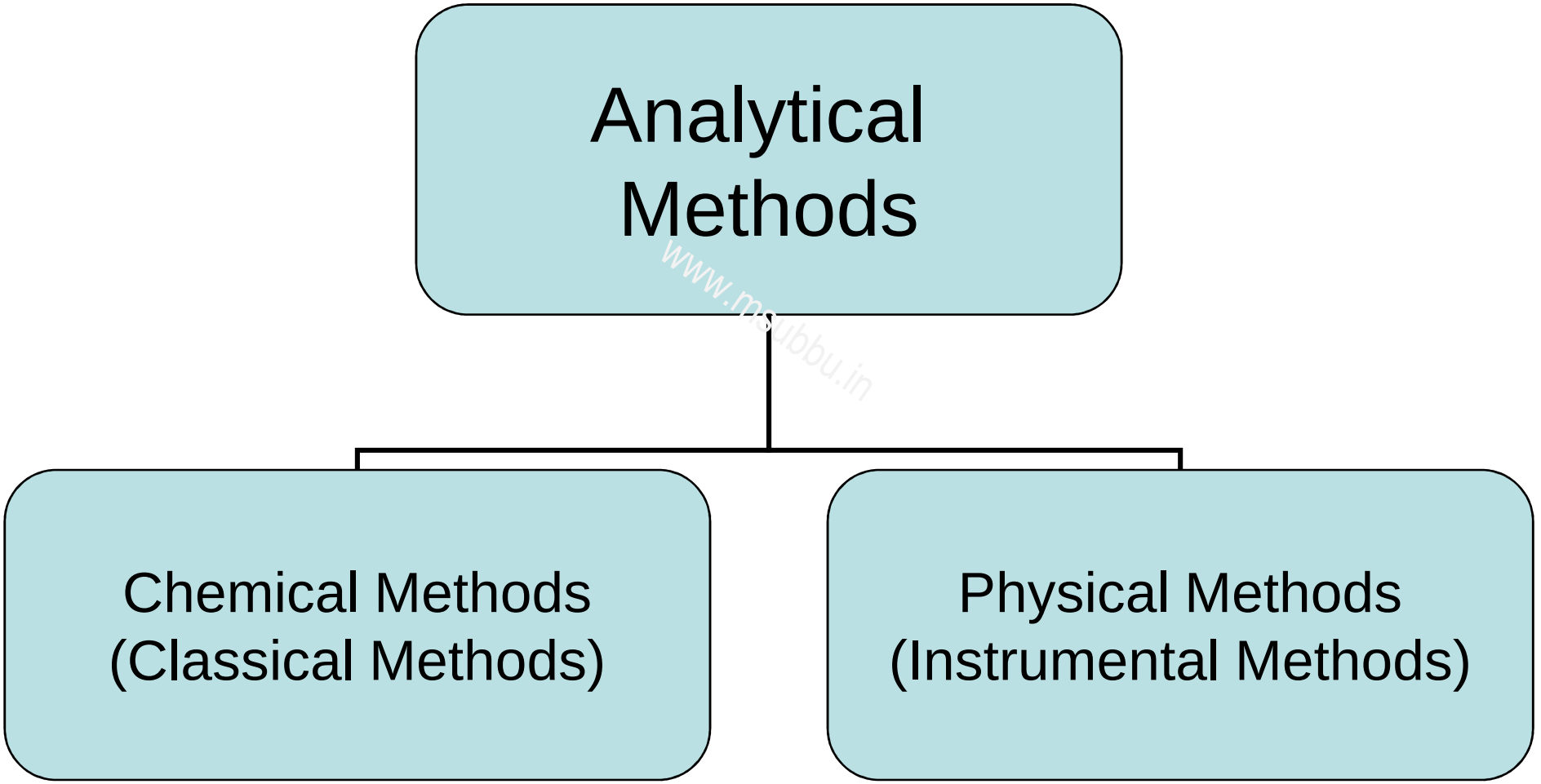
- Definition:

  "The science and art of determining composition of material in terms of element or compound content"

  - Concerned with chemical characterization of matter

  - Involves Qualitative and Quantitative determination

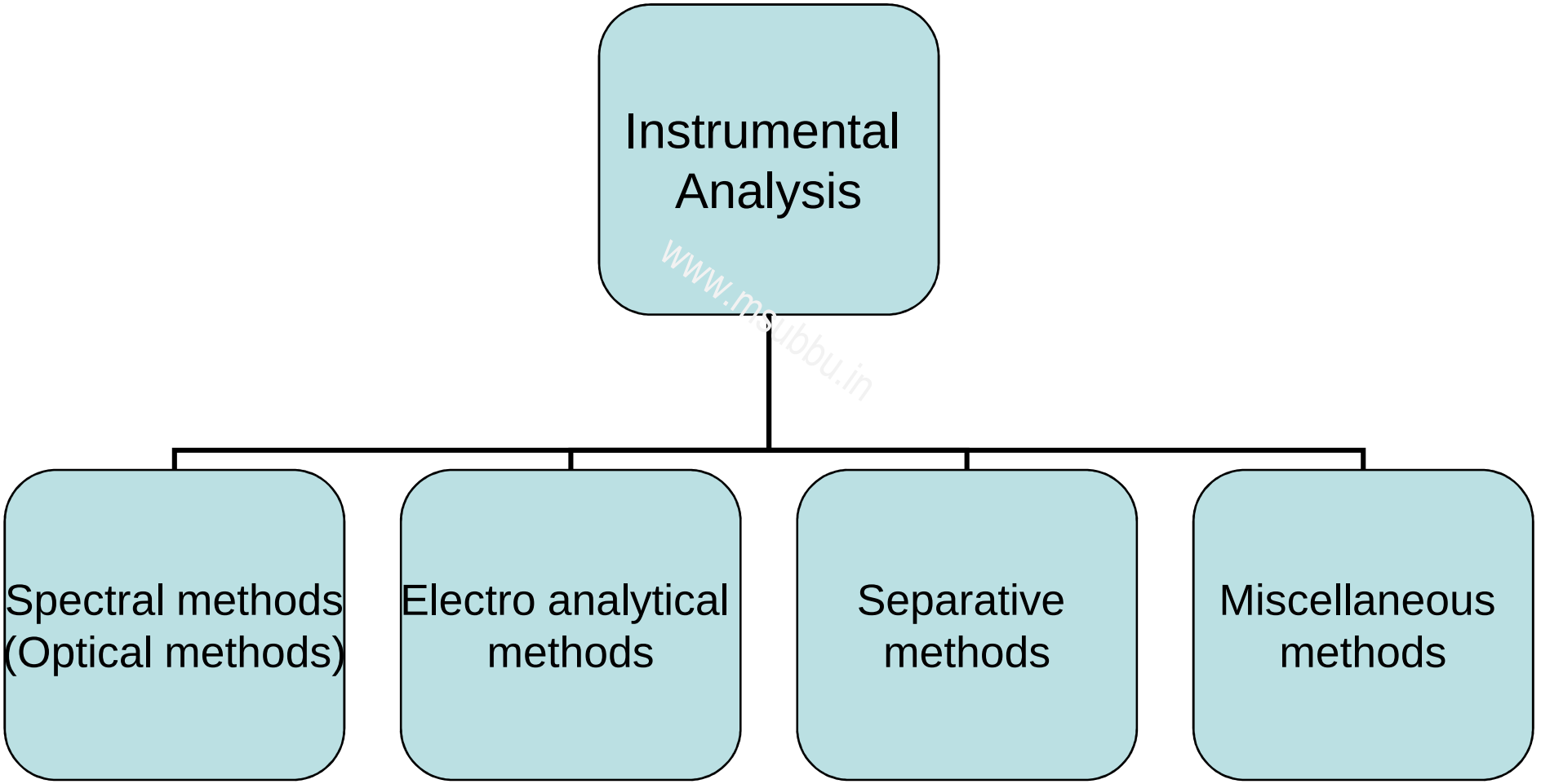
Classification of Analytical Methods



Classical Methods

- Gravimetric method
- Volumetric method
  - Acid-base titrations
  - Oxidation-reduction titrations
  - Precipitation titrations
  - Complexometric titrations

Instrumental Methods



Spectral Methods

- Visible spectroscopy
- Colorimetry, Nesslerimetry
- UV-visible spectrometry
- IR spectroscopy

- X-ray diffraction

- Atomic absorption spectroscopy
- Atomic emission spectroscopy
- Flame photometry
- Polarimetry
- Refractometry
- Nephlometry/Turbidimetry

Electro Analytical Methods

- Conductometry
- Potentiometry, pH metry
- Amperometry

Separative Methods

- Chromatographic methods
  - Column chromatography
  - Thin-layer, paper chromatography
  - Gas chromatography
  - High performance liquid chromatography

Miscellaneous Methods

Thermal methods:

- Thermogravimetric analysis
- Differential thermal analysis
- Differential scanning calorimetry

Syllabus Contents
(Total 5 units)

- Spectral methods – 2.25 units
- Electro analytical methods – 1 unit
- Separative methods – 1 unit
- Thermal methods – 0.75 unit

Text Book

- Skoog D.A. and West D.M., Hollar F. J., Crouch S. R., "Fundamentals of Analytical Chemistry ", 8th Edition, 2004, Thomson Learning - Brooks/Cole, USA