1.	Title of the course	Analytical Techniques and Instrumentation
2.	Course number	CH506M
3.	Structure of credits	2-0-3-4
4.	Offered to	PG
5.	New course/modification to	Modification To CH5026/17
6.	To be offered by	Department of Chemical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To introduce the principles of different analytical instruments for the characterization of particles and materials.	
10.	**Course Content:** Introduction of statistical terms, calibration methods; Chromatographic techniques: gas chromatography, high performance liquid chromatography, size exclusion chromatography; Spectroscopic techniques: uv-visible spectroscopy, Fourier transform infrared spectroscopy; Light scattering and particle characterization techniques: microscopy, dynamic light scattering, zeta potential, turbidity; Material characterization techniques: X-ray diffraction, scanning electron microscopy, transmission electron microscopy, X-ray photoelectron spectroscopy, BET analysis; Thermal analysis techniques: thermogravimetric analysis, differential scanning calorimetry, isothermal titration calorimetry. **Laboratory:** Experiments based on the above techniques.	
11.	**Textbook(s):** 1. Cazes J, *Ewings Analytical Instrumentation Handbook*, 3rd Edition, CRC Press (2004). 2. Patience G, *Experimental Methods and Instrumentation for Chemical Engineers*, 2nd Edition, Elsevier (2018).	
12.	**Reference(s):** 1. Berne B and Pecora R, *Dynamic Light Scattering: with Applications in Chemistry, Biology and Physics*, 1st Edition, Dover Publications (2000). 2. Brown M E, *Introduction to Thermal Analysis*, 2nd Edition, Springer-Verlag New York Inc. (2001). 3. Hansen L D, Transtrum M and Quinn C, *Titration Calorimetry: From Concept to Application*, 1st Edition, Springer (2018). 4. Van de Hulst H C, *Light Scattering by Small Particles*, 1st Edition, Dover Publications (1981).	