Modern mass spectrometry

Schedule:

Week 1: Fundamentals of Mass Spectrometry (MS). Instrumentation and analysis of mass spectra.

Week 2: Ionization Methods. Description of ion sources and their applicability to different compounds and compound classes

Week 3: Introduction to Analyzers. Performance characteristics of analyzers, the significance of resolution, and determination of elemental compositions.

Week 4: Direct Injection Techniques. Analysis of complex systems and the role of high-resolution analyzers in component identification.

Week 5: Data Processing Methods in Mass Spectrometry. Application of algorithms and data reduction methods, their capabilities, and limitations.

Week 6: Applications of Coupled Techniques. Applications and implementation of HPLC-MS, GC-MS, CE-MS, and ICP-MS couplings.

Week 7: Tandem Mass Spectrometry (MS/MS) Methods. Tandem mass spectrometers and applications of hybrid techniques.

Week 8: Tandem Mass Spectrometry in Structural Analysis. Application of tandem mass spectrometry in structural elucidation. Characteristic fragmentation pathways and their analytical applications.

Week 9: Proteomic Applications of Mass Spectrometry. Possibilities for peptide and protein sequencing, and applications of various tandem mass spectrometry methods.

Week 10: Mass Spectrometry for the Analysis of Polymers and Copolymers. Determination of polymer end-groups and structure using mass spectrometry. Difficulties in evaluating copolymer mass spectra and data processing options.

Week 11: Application of Mass Spectrometry for Determining the Average Molecular Weight of Polymers. Comparison of absolute and relative methods, and characterization of molecular weight distributions.

Week 12: Case Studies. Fragmentation pathways of flavonoids, mass spectrometric analysis of complexes, and investigation of non-polar components using soft ionization methods.