**Modern Techniques in analytical chemistry**

**Spectroscopic techniques**

**Separation Techniques**

**Mass Spectrometry**

**Microscopic and surface techniques**

**Electrochemical techniques**

**Hybrid/Hyphenated Techniques**

**Chemometrics for Analytical Chemistry**

**Design of experiments**

[**Matrix-assisted laser desorption/ionization (**](https://en.wikipedia.org/wiki/Matrix-assisted_laser_desorption/ionization)**MALDI)**

**Mass Spectrometry and Related Techniques**

**Mass Spectrometer Block Diagram**

**General Description of MS components**

**Gas Phase and Desorption Sources**

**Hard and Soft Sources**

**Electron Ionization/Electron Impact (EI)**

**Chemical Ionization (CI)**

[**MALDI-TOF Mass Spectrometry**](https://www.creative-proteomics.com/technology/maldi-tof-mass-spectrometry.htm)

**Double focusing magnetic sector Mass Analyzers**

**Ion Trap Mass Analyzers**

**Time-Of-Flight (TOF) Mass Analyzers**

[**Quadrupole**](https://en.wikipedia.org/wiki/Quadrupole_mass_analyzer) **Mass Analyzers**

**MALDI-TOF in the Clinical Laboratory**

**General schematic for MS analysis of ionized microbiological isolates**

**What is MSMS?**

**Tandem Quadrupole MS**

**Separation Techniques**

**Solid Phase Extraction**

**How does SPME work?**

**Components of a Manual SPME Holder**

**SPME fibers available**

[**Headspace Solid Phase Microextraction**](https://pubs.acs.org/doi/abs/10.1021/jf402487a) **(HSSPME)**

[**Direct immersion solid-phase microextraction**](https://www.ncbi.nlm.nih.gov/pubmed/30119747) **(DISPME)**

**In vivo SPME sampling system**

**HS-SPME-GC MS method**

**Injecting and Running a Sample on GC**

**Liquid Phase Microextraction procedure**

**Schematic of a Gas Chromatograph**

**GC Column and Typical Temperature Program**

**Injector and Detectors**

**Application**

**Capillary GC/MS**

**HS-LPME-GC MS method**

**Fourier-transform infrared spectroscopy**

**GC-FTIR**

**Chemometrics for Analytical Chemistry**

**Linear algebra and its applications**

**Vectors and Matrix**

[**Matlab software**](https://www.google.com/search?q=What+is+a+Matlab+software%3F&sa=X&ved=2ahUKEwj1i42a8qHiAhVO6aQKHVMWC6MQzmd6BAgNEAk)

**Multiple linear regression (MLR)**

**[Classical Least Squares (CLS) Method](https://eigenvector.com/training/courses/classical-least-squares-cls-methods/)**

**Inverse Least Squares (ILS) regression**

**Planning and design of experiments (DOE)**

**Screening design: Factorial design, Full factorial design, Fractional factorial design, Orthogonal array design, Plackett–Burman design (PBD)**

**Graphs**

**Optimization design: Central composite design, Box–Behnken design, Doehlert design, Orthogonal array design, Full factorial design for optimization, Central composite design (CCD), Box–Behnken design (BBD)**

**[Taguchi methods](https://en.wikipedia.org/wiki/Taguchi_methods)**