

# Analytical Chemistry and Instrumentation

**Offered every Fall semester**



**Register for this transferable course offered at MCTC every Fall, with lecture (CHEM 2410) and lab (CHEM 2420) components**

For more information you may contact: Dr. Rekha at

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- Are you a science or engineering student looking for higher science courses offered at MCTC that are transferable to the University of Minnesota or other schools?
- Interested in pursuing any profession that requires the knowledge of sample analysis and instrumentation?
- Interested in job opportunities in industry, academic and environmental analysis labs?
- Want to learn about the importance of analytical chemistry in the context of FDA, EPA and USDA regulations and ISO standards?
- Want to explore methods to analyze chemical, environmental, food, forensic, biological or engineering materials?
- Want to learn how pharmaceutical industry utilizes analytical methods to maintain quality control?
- Want to test water-quality?
- Want to learn how the industry tests and maintains quality of the products to meet regulatory requirements?
- Are you a chemistry or biotechnology program student?

**MCTC's CHEM 2410 and CHEM 2420 courses are right for you!**

**Analytical Chemistry Lecture (CHEM 2410); 3.0 credits; Prerequisite: CHEM 1152 (or equivalent of General/Principles of Chemistry-2); Pre- or Co-requisite: BIOT 2320 or CHEM 2320;**

**Analytical Chemistry Lab (CHEM 2420); 2.0 credits; Prerequisite: CHEM 1152; Pre- or Co-requisite: BIOT 2320; CHEM 2410; Offered every Fall.**

- The 2410 and 2420 courses are transferable to University of Minnesota, St. Cloud State University and to other institutions.
- You will explore the applications not only to chemical and biochemical labs but to many disciplines including life sciences, environmental science, food science, nanotechnology, engineering, pharmaceuticals, medical technology, forensic science, etc.
- The lecture and laboratory will cover not only traditional analytical concepts and methods, but also instrumentation techniques, and in the context of FDA, EPA and USDA regulations. Hence the pre-/co-requisite BIOT 2320 course serves as a supporting course.
- Guest-lectures from professionals from research labs and industry, and field-trips will be an integral part of the course.
- The course provides an opportunity to explore an independent literature survey project.
- You will learn about the importance of analytical chemistry in ensuring quality control in various industries.
- You will apply what you learn in the Regulatory Affairs and QC lab skills course (BIOT 2320) in the Analytical Chemistry course.

Course components meet the expectations of various industry and university employers for internships and laboratory support positions.

**CHEM 2410:** This lecture course introduces the principles of analytical methods and instrumentation. You will learn the theories of various chemical and biochemical methods of analyses. You will explore the principles of ionic equilibria, acid-base, complexometric, redox and electro analytical techniques. You will gain an understanding of various instrumentation including spectroscopic and chromatographic methods. You will appreciate the application of analytical chemistry in meeting the regulatory requirements of Food and Drug Administration and Environmental Protection Agency in a variety of industrial and research applications. You will learn about HVAC requirements in cleanroom environments and develop the necessary skills to document and statistically analyze data.

**CHEM 2420:** This laboratory course will use an applications-based approach to chemical and biochemical methods of analyses. You will carry out classical analytical techniques as well as instrumental methods of analysis. You will incorporate mathematical calculations, statistical analysis of data and computational methods. You will apply aqueous ionic equilibria principles, explore compendium of methods and adopt various instrumentation methods including chromatography and spectrometry. You will explore analytical methods and standards important in quality control in regulatory environments. You will learn to do detailed work with precision and accuracy. You will incorporate documentation procedures and validation principles according to regulatory affairs standards.