

## CHEM 5338: Separation Methods of Analysis

2:00-3:15 pm Tue & Thu, fall 2018  
Credit: 3  
Chemistry T215  
Instructor: Dr. Xudong Yao

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Welcome to "Separation Methods of Analysis." This course is designed to provide you with background necessary to understand and appreciate theoretical and practical aspects for modern separation methods. Your proactive learning is essential to benefit the most from the course. Prerequisite courses: Basic Analytical Chemistry, Instrumental Methods of Analysis, and Physical Chemistry or comparable courses with the consent of the instructor. The objectives of this course are to (1) describe the general principles by which separation methods work, (2) describe the methods that are commonly used for separations, (3) discuss the selection and assembly of separation methods based on molecular properties of analytes, and (4) discuss applications of separation methods.

### Required textbook:

"Introduction to Modern Liquid Chromatography," Lloyd R. Snyder, Joseph J. Kirkland, John W. Dolan, Wiley, 3<sup>rd</sup> Ed, 2010

Other course resources include:

- Chromatography chapters of Skoog, Holler, Crouch, "Principles of Instrumental Analysis," 6<sup>th</sup> Ed, Thomson Publishing, 2006.
- "The Essence of Chromatography," Colin F. Poole, Elsevier, 2003
- "Chromatography: Concepts and Contrasts," James M. Miller, 2<sup>nd</sup> Ed, Wiley, 2005
- Original research papers and reviews.
- Student presentation slides.

### Topics to be covered:

- Principles for separation and chromatography
- HPLC: columns, instrumentation, and gradient elution
- Reversed-phase chromatography
- Normal phase chromatography and HILIC
- Separation of ionic compounds
- Separations of stereoisomers
- Size-based separation
- LC/LC
- Sample preparation
- Quantitative and quantitative analysis
- GC, GC-MS, and GC/GC-MS
- Capillary electrophoresis and capillary electrochromatography
- Gel electrophoresis

**Grading system:** (1) Close-book Exam, 30%; (2) Open-book Exam, 30%; (3) Course Project 30%; and (4) Class Participation (10%).