



Department of Chemistry  
UNIVERSITY OF WISCONSIN-MADISON

**University of Wisconsin-Madison**  
**Chemistry 625 – Separations in Chemical Analysis**  
**2 – 3 credits**  
<https://canvas.wisc.edu/courses/105461>  
**MW 11-11:50, room 2311 Chemistry**  
**Laboratory Friday 9:55-12:55 pm, room 2330 Chemistry**

INSTRUCTOR	LABORATORY DIRECTOR	TEACHING ASST. YASMIN GARCIA
PROFESSOR LLOYD M. SMITH	DR. ROBERT MCCLAIN	2330 CHEMISTRY
OFFICE – 4209 CHEMISTRY	2330B CHEMISTRY	OFFICE HOURS MONDAY 12 – 1:30 PM
OFFICE HOURS AFTER CLASS OR BY APPT.	OFFICE HOURS IN LAB OR BY APPT.	YASMIN.ALVAREZGARCIA@WISC.EDU
SMITH@CHEM.WISC.EDU	ROBERT.MCCLAIN@WISC.EDU	

**Official Course Description and prerequisites.**

Fundamentals of transport processes and the origins of chemical potential differences giving rise to separation. Principles of chromatography, electrophoresis and field flow fractionation. Lecture and laboratory projects. Pre-Requisites: 1 sem organic & 1 sem phys chem, or consent of instructor.

This course will cover the basic theory and practice of chromatographic and electrophoretic separations used in chemical and biochemical analysis. It is offered for either 2 credits (lecture only) or 3 credits (lecture + laboratory). In the lecture portion of the class the class will meet for two 50-minute class periods each week over the fall semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 2 hours out of classroom for every class period. In the laboratory section of the course students will earn 1 credit by spending a total of at least 45 hours on learning activities and working with the instructors. This includes scheduled lab time, open lab time, and any additional time outside lab. Topics to be covered include thin-layer chromatography, gel filtration, ion exchange, gas chromatography, high performance liquid chromatography, SDS polyacrylamide gel electrophoresis, isoelectric focusing, agarose gel electrophoresis of DNA, pulsed field gel electrophoresis, and capillary electrophoresis. There is no textbook for the course, handouts will be provided on various topics. The laboratory will offer substantial hands-on experience with separation methods and is recommended for students who have not obtained such experience elsewhere.

The semester will be divided into two parts. In the first part, the class will follow a classic “lecture, listen” model. Lectures will be given on the basic principles of chromatography and electrophoresis. Occasional problem sets will be assigned and exams will be given on both topics. For the second half of the semester, students will be responsible for researching a topic of their choice in the area of separations and will present a lecture on the material to the rest of the class. The topic is to be given in writing to Professor Smith for approval, by September 28. Each presentation will be 20 minutes plus 5 minutes for discussion. They will also prepare a ~10 page paper on the subject, to be distributed to the class a week before their lecture, along with 1-3 homework problems for the class on the material presented. These will be due the Monday following the presentation in class, and will be graded and returned by the presenters.

There are two main parts to the laboratory for the course. There is a set of pre-planned experiments covering basic separation principles and techniques. A brief write-up will be required for each experiment that should include a description of the experiment, the data obtained, and the conclusions that can be drawn from the data. The second part of the laboratory will be devoted to separations projects executed by the students individually, or in small groups of 2 or 3. These projects are to explore either some separation principle, or a particular separation problem, and are to be presented in a final report.

Grading for students taking the course for two credits (no laboratory) will be based upon the two midterm exams (25% each), homework (10%), and the presentation/paper (20% each). Grading for students taking the course for three credits will be based upon the midterm exams (15% each), homework (10%), the presentation/paper (15% each), performance on the preplanned laboratory experiments (15%), and performance on the final lab project and report (15%). There will be no final exam.

Students successfully completing this course will have acquired a solid understanding of the basic principles and terminology of chemical separations and the ability to read and comprehend the scientific literature in the field. Those who also take the lab will acquire the hands-on experience necessary to relate the theory of separations to its practical implementation.

## **RULES, RIGHTS & RESPONSIBILITIES**

- See the Guide's [Rules, Rights and Responsibilities](#)

## **ACADEMIC INTEGRITY**

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison's community of scholars in which everyone's academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review. For more information, refer to [studentconduct.wiscweb.wisc.edu/academic-integrity/](http://studentconduct.wiscweb.wisc.edu/academic-integrity/).

## **ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES**

**McBurney Disability Resource Center syllabus statement:** "The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA."

<http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php>

## **DIVERSITY & INCLUSION**

**Institutional statement on diversity:** "Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world."

<https://diversity.wisc.edu/>