



**CHEM 300L**  
**Analytical Chemistry**

**Units:** 4

**Term—Day—Time:** Fall 2023—MWF—10:00-10:50

**Location:** GFS 101 (and/or Zoom)

**Start date:** August 21, 2023

**End date:** December 01, 2023

**Lecture Instructor:** Prof. Michael Inkpen

**Office:** LJS 250

**Office Hours:** Mondays 11 am-12 pm, or by appointment.

**Contact Info:** [inkpen@usc.edu](mailto:inkpen@usc.edu), +1 (213) 821-1910.

**Lab Instructor:** Prof. Mark Thompson

**Office:** SGM 216

**Office Hours:** By appointment.

**Contact Info:** [met@usc.edu](mailto:met@usc.edu), +1 (213) 740-6402.

**Teaching Assistants:**

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Chris Pakhanyan, [pakhanya@usc.edu](mailto:pakhanya@usc.edu)

Please allow 2 working days for a response from instructors or TAs (plan accordingly).

**IT Help:** N/A, use Blackboard.

**Catalogue Description:** Theory and practice in chemical analysis, emphasizing instrumental techniques; error analysis, fractional distillation, extraction; chromatography; visible, ultraviolet, and infrared spectroscopy; introductions to electrochemistry and nuclear magnetic resonance spectroscopy.

**Prerequisite(s):** 1 from CHEM 105B or CHEM 108 or CHEM 115B

**Co-Requisite(s):** 1 from CHEM 322A or CHEM 325A

**Concurrent Enrollment:** N/A

**Recommended Preparation:** N/A

### COVID-19 Statement

Students are expected to comply with all aspects of USC's COVID-19 policy. Failure to do so may result in removal from the class and referral to Student Judicial Affairs and Community Standards.

<https://coronavirus.usc.edu>

### Course Notes

Letter grades will be assigned based on the graded components described below. Copies of lecture slides will be provided on Blackboard.

### Technological Proficiency and Hardware/Software Required

N/A

### Required Readings and Supplementary Materials

#### Required Texts:

- (1) *Quantitative Chemical Analysis* (9th Edition), Daniel C. Harris  
W. H. Freeman and Co., 2015, ISBN-13: 9781464135385

**Supplemental Materials:** Supplemental materials may be provided from various sources, including the following textbook(s):

- (2) *Solutions Manual for Quantitative Chemical Analysis* (9th Edition), Daniel C. Harris  
W. H. Freeman and Co., ISBN-13: 9781464175633



### Description and Assessment of Assignments

Homework assignments consisting of Exercises and/or Problems assigned for each chapter will be posted on the course website. These will not be collected or graded, but you must do them promptly to stay on track in CHEM 300L. CHEM 300L requires working a lot of numerical problems, particularly in chapters 1-11.

### Grading Breakdown

**Lecture Section** (normalized to 55% of total 300L grade)

1 hour in-class exams (x3): 60%

Final exam (December 11<sup>th</sup>, 8-10 am): 40%

No make-up exams can be given. Absences will be excused only for medical reasons or in the case of extreme necessity. Written excuses or student health center slips must be presented to the lecturer for approval by email and should be secured in advance whenever possible. In the case of an excused absence, a grade will be assigned which is based on the average of the students class rank on the other two exams. Any unexcused absence will result in a grade of zero for that exam. Requests for regrading of any exam must be submitted within one week after the graded exam is made available to you. Graded exams will be photocopied before redistribution. A request for regrading of an altered exam is a serious violation of academic integrity.

**Lab Section** (normalized to 45% of total 300L grade)

Full details provided in the lab manual.

**To receive a passing grade in the course, you must receive a passing grade (prior to normalization) in BOTH the lab and lecture parts.**

### Assignment Submission Policy

**Lecture Section**

TBA

**Lab Section**

Full details provided in the lab manual.

### **Policy on Dropping and Incompletes**

November 10, 2023 is the last day to drop this course with a mark of W. University policy requires strict adherence to this deadline. The mark of Incomplete (IN) can be given only to a student who (1) is doing passing work as of November 10, 2021 and (2) is unable to complete the course because of serious illness or documented emergency occurring after that date.

**Note that dates given are not final and subject to change.**

### **Additional Policies**

Students are expected to attend all in-person lectures and participate in class discussions. The use of laptops and other electronic devices during lectures for class-related web searches or calculations is encouraged, so long as their use is not disruptive to the rest of the class.

### **University Holidays (no classes on these dates)**

September 4 – Labor Day

October 12-13 – Fall Recess

November 10 – Veteran's Day

November 22-26 – Thanksgiving Recess

## Course Schedule: A Weekly Breakdown

A rough outline of the topics to be covered is provided below (dates are subject to change).

Class #	Date	Topic	Deliverables
1	08/21	Ch. 0: Introduction	
2	08/23	Ch. 1 Measurements; 2 Tools	
3	08/25	Ch. 3 Experimental Error	
4	08/28	Ch. 4 Statistics	
5	09/30	Ch. 4 Statistics	
6	09/01	Ch. 6 Equilibrium	
September 4 – Labor Day			
7	09/06	Ch. 8 Activity and Systematic Equilibrium	
8	09/08	Ch. 8 Continued	[End of Exam 1 Material]
9	09/11	Ch. 9 Monoprotic Acids	
10	09/13	-	<b>Mid-Term EXAM 1</b>
11	09/15	Ch. 10 Polyprotic Acids	
12	09/18	Ch.11 Acid-base titrations	
13	09/20	Ch. 11 Continued	
14	09/22	Ch. 12 EDTA Titrations	
15	09/25	Ch. 12 Continued	
16	09/27	Ch. 14 Fundamentals of Electrochemistry	
17	09/29	Ch. 14 Continued	
18	10/02	Ch. 15 Electrodes and Potentiometry	
19	10/04	Ch. 15 Continued	
20	10/06	Applications of Electrochemistry	[End of Exam 2 Material]
21	10/09	Ch. 18 Fundamentals of Spectroscopy	
22	10/11	-	<b>Mid-Term EXAM 2</b>
October 12-13 Fall Recess			
23	10/16	Ch. 18 Continued	
24	10/18	Ch. 18 Continued	
25	10/20	Ch. 19 Applications of Spectroscopy	
26	10/23	Ch. 20 Spectrometers - Interferometry	
27	10/25	Ch. 20 Continued	
28	10/27	Ch. 21 Atomic Spectroscopy	
29	10/30	Ch. 21 Continued	[End of Exam 3 Material]
30	11/01	Ch. 22 Mass Spectrometry	
31	11/03	-	<b>Mid-Term EXAM 3</b>
32	11/06	Ch. 22 Continued	
33	11/08	Ch. 23 Analytical Separations	
34	11/13	Ch. 24 Gas Chromatography	
35	11/15	Ch.24 Continued	
36	11/17	Ch 25 HPLC	
37	11/20	Ch 25 Continued	
November 22-26 Thanksgiving Holiday			
39	11/27	In Class Review (or additional lecture)	
40	12/29	In Class Review (or additional lecture)	
41	12/01	In Class Review (or additional lecture)	
December 2-5 – Study Days			
-	12/11 8-10 am	All Materials	<b>FINAL EXAM</b>

## Statement for Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with *The Office of Disability Services and Programs (DSP)* each semester (for more information, see below). A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to course instructors as early in the semester as possible.

## Statement on Academic Conduct and Support Systems

### Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” [policy.usc.edu/scampus-part-b](http://policy.usc.edu/scampus-part-b). Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, [policy.usc.edu/scientific-misconduct](http://policy.usc.edu/scientific-misconduct).

Discrimination, sexual assault, intimate partner violence, stalking, and harassment are prohibited by the university. You are encouraged to report all incidents to the Office of Equity and Diversity/Title IX Office <http://equity.usc.edu> and/or to the Department of Public Safety <http://dps.usc.edu>. This is important for the health and safety of the whole USC community. Faculty and staff must report any information regarding an incident to the Title IX Coordinator who will provide outreach and information to the affected party. The sexual assault resource center webpage <http://sarc.usc.edu> fully describes reporting options. Relationship and Sexual Violence Services <https://engemannshc.usc.edu/rsvp> provides 24/7 confidential support.

General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted, and the obligations both to protect ones own academic work from misuse by others as well as to avoid using anothers work as ones own. Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. The recommended sanctions are located in Appendix A: <http://www.usc.edu/dept/publications/SCAMPUS/gov/>. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” [policy.usc.edu/scampus-part-b](http://policy.usc.edu/scampus-part-b). Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, [policy.usc.edu/scientific-misconduct](http://policy.usc.edu/scientific-misconduct). Should there be any suspicion of academic dishonesty, students will be referred to the Office of Student Judicial Affairs and Community Standards for further review. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>.

### Support Systems:

#### *Scholarly Writing*

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute <http://ali.usc.edu>, which sponsors courses and workshops specifically for international graduate students.

#### *Counseling and Mental Health - (213) 740-9355 – 24/7 on call* [studenthealth.usc.edu/counseling](http://studenthealth.usc.edu/counseling)

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

*National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call*

[suicidepreventionlifeline.org](https://suicidepreventionlifeline.org)

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

*Relationship and Sexual Violence Prevention and Services (RSVP) - (213) 740-9355(WELL), press "0" after hours – 24/7 on call*

[studenthealth.usc.edu/sexual-assault](https://studenthealth.usc.edu/sexual-assault)

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

*Office of Equity and Diversity (OED)- (213) 740-5086 | Title IX – (213) 821-8298*

[equity.usc.edu](https://equity.usc.edu), [titleix.usc.edu](https://titleix.usc.edu)

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following *protected characteristics*: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations. The university also prohibits sexual assault, non-consensual sexual contact, sexual misconduct, intimate partner violence, stalking, malicious dissuasion, retaliation, and violation of interim measures.

*Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298*

[usc-advocate.symlicity.com/care\\_report](https://usc-advocate.symlicity.com/care_report)

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

*The Office of Disability Services and Programs (DSP) - (213) 740-0776*

[dsp.usc.edu](https://dsp.usc.edu)

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

*Campus Support & Intervention - (213) 821-4710*

[campussupport.usc.edu](https://campussupport.usc.edu)

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

*Diversity at USC - (213) 740-2101*

[diversity.usc.edu](https://diversity.usc.edu)

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

*USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*

[dps.usc.edu](https://dps.usc.edu), [emergency.usc.edu](https://emergency.usc.edu)

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

*USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call*

[dps.usc.edu](https://dps.usc.edu)

Non-emergency assistance or information.