
Chemistry 126: Biophysical and Medicinal Chemistry Laboratory

(Monday, Tuesday and Wednesday Sections)

I. Instructors

Sheryl Hemkin– Lab Instructor (Monday)
Tomsich Hall 106
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Email: hemkins@kenyon.edu
Office hours: M (11-12n & 4-4:45p); W (11-12n & 1:10-2pm) & by appointment

Kerry Rouhier– Lab Instructor (Tuesday)
Tomsich Hall 212
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Email: rouhierk@kenyon.edu
Office hours: M (11-12:30P), T (8-10A), Th (12:30-2P)

Vivian Ezeh– Lab Instructor (Wednesday)
Tomsich Hall 208
PBX: 5645
Email: ezehv@kenyon.edu
Office hours: T (9A-11A)

Carolyn Waggoner – Teaching Lab Coordinator
Tomsich Hall 013
PBX: 5248
Email: waggonerc@kenyon.edu

II. Materials and Resources

- *Chemistry 126 Laboratory Manual* (Distributed by instructor during the first week of classes)
- Basic scientific calculator
- Laboratory notebook (you may continue to use your notebook from CHEM 123 or contact Carolyn Waggoner to purchase a new notebook)

Electronic resources for the course will be placed on the course Moodle page (<https://moodle.kenyon.edu>)

III. Class Meeting Times and Place

Chemistry 126 meets in Tomsich Hall 103 at 1:10 pm once each week for a three-hour laboratory. Because safety notes and other important information may be discussed in the pre-lab introductions, students must be on time to participate in the lab. Most experiments are designed to be completed by 4 pm, though some may run over. Students finishing lab work before 4 pm are expected to remain to analyze results or begin post-lab exercises. For labs executed in small groups, this is a particularly good time to discuss your results with other group members.

IV. Co-requisites/Pre-requisites

CHEM 124 is a co-requisite for CHEM 126 lab if you did not pass CHEM 122. Withdrawing late (WL) from this lab does not require withdrawing from CHEM 124; they are separate courses with separate grades.

V. Moodle Quizzes

Starting the second week of the course, a pre-lab quiz will be available on Moodle before the beginning of each new laboratory experiment (multiple-week experiments will only have a quiz before the first week of the lab). To receive credit, you must complete the quiz by 10 am the day your lab section meets. The quizzes will have a 45 minute time limit and you will have unlimited attempts to receive the best grade. The motivation for administering quizzes is to encourage you to be well-prepared for your laboratory work. Pre-lab lectures will be brief to allow time for work in the laboratory and time spent in preparation for each lab will allow you to work efficiently and safely.

VI. Laboratory Notebooks and Reports

An important goal for this course is to continue developing effective science communication skills through the use of your lab notebook and by presenting your results and analysis as calculations, graphs, annotated spectra and short discussions.

You will use your laboratory notebook for three aspects of your experimental work:

1. Before coming to lab, to prepare for the experiment you will conduct by writing an 'Introduction' section; carbon copies of your 'Introduction' page(s) must be submitted at the beginning of class.
2. While working in the lab, to record all of your work in a 'Procedure' section; carbon copies of your 'Procedure' page(s) must be submitted at the end of class, before leaving the lab.
3. After you complete your lab work, to communicate your results as an 'Analysis' section with attachments (graphs or spectra); carbon copies of your 'Analysis' page(s), along with attachments must be submitted to the instructor by the time and day announced by your instructor.

These components of your laboratory notebook constitute a significant part of your course grade (see below). It is essential that your laboratory notes and reports are clearly written and can be understood by someone who is otherwise unfamiliar with the experimental work you conducted. Detailed explanations of how to use your laboratory notebook to record your experimental work is described in the CHEM 126 *Laboratory Notebook Guide*.

Reports submitted late will receive a penalty of 10% for each 24 hours it is late. Reports submitted more than 5 days late will not be accepted.

VII. Exams

One exam will be given during the last week of the semester (April 29-May 1). Attendance is mandatory. There will be no make-up exams given unless the absence is excused.

VIII. Studying and Out-of-Class Assistance

Students are expected to work outside of the regular meeting time to prepare for lab (by reading the lab manual and related sections of the CHEM 124 textbooks) and analyze results. You should be studying ~4 hours a week outside of class for a 0.25 credit course. To assist you, the instructors have office hours scheduled during the week, and peer chemistry tutors are available at *The Math and Science Skills Center* (in Tomsich 101) every Sunday, Tuesday, and Thursday from 7-10 pm.

IX. Grades

Component	Weight
Completion of Experiments Safely & Laboratory Reports	80
Quizzes	10
Exam	10

Each lab exercise will be scored such that 50% of the grade is for the safe completion of the experimental work and 50% of the grade is for the report (notebook pages for the Introduction, Procedure, and Analysis sections, with attachments).

X. Attendance Requirements

Class meetings and the completion of the experiments are an essential part of this course and your grade. Therefore, students are required to attend their assigned laboratory section every week. If you are not able to attend a laboratory meeting, please contact the instructor by e-mail as soon as you realize you will not be able to attend.

Excused Absence due to illness.

We call your attention to the college policy on class attendance in the Course of Study:

“Absences for reasons of illness are not ordinarily excused: only when a student is declared by the College physician to be infirm (in a hospital or at home) will a health report be sent from the Health and Counseling Center the dean of students, giving the days when each patient is judged infirm and recommending that the student’s class absences be excused.”

If you miss a lab section due to severe illness or emergency, you **must** consult the college Health Center for your name to appear on the Dean of Students Excused Absence List. **ONLY** the Dean of Students (NOT the instructor) offers an Excused Absence due to illness or emergency.

Even with an Excused Absence you must make up the missed experiment. If you are not able to attend a laboratory meeting, please contact your instructor by phone or email as soon as possible and arrange to make up the work, ***the best option is to do the make up in the same week as the absence occurs.*** To make up work in a different laboratory section, you must have permission from *both* instructors involved prior to the start of the lab experiment.

Unexcused Absence.

You cannot make up an unexcused absence. Unless there are extenuating circumstances, to receive a non-failing grade for this course, you must satisfactorily complete all the experiments.

XI. Student Athletes

Meet with your instructor in the first week of classes to discuss any athletic conflicts. Only two (2) planned absences are allowed — additional absences are considered unexcused. —so please consult your schedule before making commitments to both activities. We call your attention to the college policy on class attendance in the *Scheduling Guidelines for Athletic Contests*.

Even with an Excused Absence you must make up the missed experiment. In consultation with your lab instructor, arrange for a make-up lab in the same week that the absence occurs. To make up work in a different laboratory section, you must have permission from *both* instructors involved prior to the start of the lab experiment.

XII. Students With Disabilities

If you have a physical, psychological, medical or learning disability that may impact your ability to carry out assigned course work, contact the Office of Disability Services at 5453. The Coordinator of Disability Services, Erin Salva (salvea@kenyon.edu), will review your concerns and determine with you what accommodations are appropriate. **ONLY** the Coordinator of Disability Services can make accommodations, but please feel free to discuss your concerns in private with me. All information and documentation of disability is confidential.

XIII. Safety

Students are expected to understand and follow the 15 safety rules explained in the document *Safety in Chemistry Department Laboratories* and safety notes presented in the pre-lab lectures. You are expected to conduct yourself in a safe manner at all times in the laboratory, and questions related to laboratory safety may appear on quizzes or exams. Failure to wear lab goggles or appropriate clothing, eating or drinking in the lab, horse-play, unauthorized experimentation, or other activities deemed unsafe by the instructor will result in your immediate dismissal from the lab for that day without an option to make up the work.

XIV. Academic Honesty

Your attention is called to the College policy on Academic Honesty (see Student Handbook). The Chemistry Department wishes to emphasize the difference between appropriate and inappropriate cooperation. Realizing that a great deal of learning results from student exchange of ideas, we want to encourage such exchanges both in laboratory and outside the laboratory. However, you must clearly understand that materials prepared for submission for grade—notebook pages, lab reports, and annotated spectral data—must be your own work.

Any and all parts of this syllabus are subject to change at any time.

Notification of any change will be made in class or via e-mail

CHEMISTRY 126: Biophysical/Medicinal Sections
Schedule of Experiments Spring 2012

Week of	Experiment	Assignments
Jan 14	Lab 1. Introduction to Structure and Nomenclature of Organic Compounds	Report
Jan 21	Lab 2. Infrared Spectroscopy	Pre-lab quiz and Report
Jan 28	Lab 3. NMR Spectroscopy – Part I	Pre-lab quiz
Feb 4	Lab 3. NMR Spectroscopy – Part II	Report
Feb 11	Lab 4. Synthesis of Aspirin – Part I	Pre-lab quiz
Feb 18	Lab 4. Synthesis of Aspirin – Part II	Report
Feb 25	Lab 5. Separation and Identification of Amino Acids	Pre-lab quiz and Report
	<i>Spring Break !!!</i>	
Mar 18	Lab 6. Introduction to GCMS; Organic Unknown : IR, NMR, and GCMS	Pre-lab quiz and Report
Mar 25	Lab 7. Development of a pH Indicator – Part I	Pre-lab quiz
Apr 1	Lab 7. Development of a pH Indicator – Part II	
Apr 8	Lab 7. Development of a pH Indicator – Part III	Report
Apr 15	Lab 8. Kinetic Analysis of Alkaline Phosphatase – Part I	Pre-lab quiz
Apr 22	Lab 8. Kinetic Analysis of Alkaline Phosphatase – Part II	Report
Apr 29	Exam and Check Out	

INTRODUCTORY CHEMISTRY LAB CORE CONCEPTS AND SKILLS

The expectation is that you will learn the following concepts and skills within the two introductory chemistry laboratory courses. Additionally, you will be responsible for using the skills throughout this lab course and all the chemistry lab courses that follow.

1. **lab notebooks:** proper recording of data and observations (refer to description in lab manual)
2. **lab safety:** see 15 points in “*Safety in Chemistry Department Laboratories*”
3. **preparing data and results:** proper labeling of spectra, graphs and tables; proper use of units; the ability to do unit conversion problems
4. **quantitative solid and liquid transfer:** use of proper techniques (ex. weigh-by-difference, reading volumes, use of density) and tools (ex. recognizing tolerance of different glassware).
5. **preparing solutions and calculating concentrations:** the ability to make dilutions and to make proper glassware choices in order to attain the desired accuracy of concentration; the ability to make the necessary calculations that will enable the proper preparation of solutions.
6. **nomenclature & structure representation:** *First semester:* bond line structure representations, basic acids and bases (prepare this list), inorganic salts and coordination compounds (prepare this list); names and symbols for elements 1-36. *Second semester:* organic nomenclature (we have this list).
7. **basic instrumentation:** *First semester:* know the physical molecular basis of UV-vis (electronic transitions). *Second semester:* IR (vibrational modes), NMR (nuclear spin) and mass spectroscopies (mass/charge of fragments).
8. **interpretation of spectral data.** annotation, modeling, and interpretation of spectra.
9. **reaction stoichiometry:** identification of the limiting/excess reagents, use of stoichiometry in titrations, the ability to calculate theoretical and percent yields.
10. **basic error analysis:** proper use of significant figures in calculations; recognize accuracy and precision and how to quantitatively describe each using percent error and standard deviation, respectively; recognize the types of error (systemic and random) and how to minimize error (identifying largest source of error, signal averaging, using trendlines/linear regression here); repeatability and reproducibility,
11. **names of common glassware and equipment:** know the proper names for the equipment in the lab drawer and any additional equipment used in experiments; use these names properly in formal communications such as laboratory reports.