
Syllabus

Instructors

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Teaching Laboratory Coordinator

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Class Meetings

Tomsich 103, once each week, MTWR 1:10p–4:00p and R 8:10-11:00a.

Required Materials

Purchase a copy of the Chem 123 Laboratory Manual for Fall 2014. This purchase also covers the cost of a laboratory notebook and a pair of safety goggles, which you will receive at check-in.

Laboratory Notebook and Reports

You are required to maintain a laboratory notebook as a written record of lab work. Label your notebook with your name. Underneath your name, write your initials and a Roman numeral, *e.g.*, “SPG-I.” You will prepare lab reports in your notebook and turn in the original pages for grading.

Lab reports must follow a standard form outlined in the *Laboratory Notebook Guide*. In addition, each experiment has a Report section that gives hints on what to include in the report.

Your laboratory reports must be submitted at the beginning of the next lab period unless otherwise specified by your instructor. Even if you are making up an experiment in a different section, your lab report is still graded by your usual instructor and is due by that instructor’s due date. Late work will not be accepted unless you have an official, excused absence from the Dean of Academic Advising. If you have an unofficial reason for being late, your instructor may accept your report, but only if you forfeit 10 percentage points for every 24 hours it is late.

Quizzes

You will have a short, online quiz each week before the laboratory period. These quizzes cover both previous experiments and upcoming experiments.

The quiz for each section is due before the start of your laboratory period. There is a quiz for each lab period, even if an experiment takes multiple lab periods.

Exams

The midterm exam is specified in the Schedule of Experiments. Attendance is mandatory. We will not schedule make-up exams without an official, excused absence from the Dean of Academic Advising.

Final exams dates will be set at a later time. The exam date and times will concur with the Registrar's scheduling for classes that start at 1:10pm MWF and TR, and 8:10am TR.

You may bring your laboratory notebook and refer to it during each examination. Each exam is 1–2 hours long.

Grading

| Component | Weight |
|--|--------|
| Safe Participation in experiments & Laboratory reports | 60 |
| Quizzes | 10 |
| Midterm exam | 15 |
| Final exam | 15 |

Excused Absence

You are required to attend your assigned laboratory section every week. 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. To make up work in a different laboratory section, you must have permission from *both* instructors, and from the Teaching Laboratory Coordinator.

Planned Absence. If you must miss an experiment for an athletic, religious, or other type of event, you must inform your instructor *one week before the experiment* and arrange to make up the missed experiment. **You will not receive credit for the experiment unless your absence is excused by Student Support** staff (defined below). Only two (2) planned absences are allowed — additional absences are considered unexcused and cannot be made up.

Illness. If you miss an experiment because of illness, you must go to the Health Center for examination and obtain an excused absence from the Campus Physician. You must also inform your instructor and arrange to make up the missed experiment. You will not receive credit for the experiment unless your absence is excused by the Campus Physician*.

* This policy may be modified to remain in accord with CDC and college guidelines.

Unexcused Absence

You cannot make up an unexcused absence. Unless there are extenuating circumstances, a single absence will result in a grade of zero (0) for that experiment. Additional absences could result in expulsion from the course.

Academic Honesty

Kenyon College is, at the core, an intellectual community of scholars – students and faculty – engaged in the free and open exchange of ideas. Critical to this lively exchange and deep engagement with ideas is the academic integrity of our work, both inside and outside the classroom.

At Kenyon we expect all students, at all times, to submit work that represents these standards of academic integrity. It is the responsibility of each student to learn and practice the proper ways of documenting and

acknowledging those whose ideas and words you have drawn upon (see Academic Honesty and Questions of Plagiarism in the Course Catalog). Ignorance and carelessness are not excuses for academic dishonesty. Because collaborative work is an integral activity in the sciences, we wish to emphasize the difference between appropriate and inappropriate cooperation. A great deal of learning results from the exchange of ideas, and we encourage such exchanges both in laboratory and outside the laboratory. *All materials submitted for a grade, however, must be prepared by you alone.* Such materials include laboratory notebooks, lab reports, problem sets, quizzes, and examinations. If you are uncertain about the expectations for academic honesty in this class, please ask for clarification.

Safety

You will receive instruction — both at the beginning of the course, and in each prelab lecture — on proper safety etiquette in the laboratory. You are expected to conduct yourself in a safe manner at all times in the laboratory. Horse-play, unauthorized experimentation, or other activities deemed unsafe by the instructor will result in your immediate dismissal from the class for the day without the opportunity to make up the experiment. Questions relating to laboratory safety may appear on the quizzes or exams.

Safety rules are detailed in the orange document you signed, *Safety in Chemistry Department Laboratories*, but some important rules include:

- Wear shoes that cover your toes.
- Legs must be covered by long pants or lab apron.
- Do not eat or drink in the laboratory, and do not bring food or drink into the laboratory.
- Wear protective eyewear while you are in the laboratory.

Students with Disabilities

Students who anticipate they may need accommodations in this course because of the impact of a learning, physical, or psychological disability are encouraged to meet with me privately early in the semester to discuss their concerns. In addition, students must contact Erin Salva, Director of Student Accessibility and Support Services (740-427-5453 or salvae@kenyon.edu), as soon as possible, to verify their eligibility for reasonable academic accommodations. Early contact will help to avoid unnecessary inconvenience and delays.

If your accommodation grants additional time on an exam, you must notify your instructor at least 1 week before the exam.

Student Athletes

Meet with your instructor to discuss any athletic conflicts. Only two (2) planned absences are allowed — additional absences are considered unexcused. 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.

Student Support staff

In this syllabus, **Student Support** refers to staff that are authorized to access your confidential, personal records. They include:

- The Dean of Academic Advising
- The Dean of Students
- The Campus Physician
- The Director of Counseling
- The Coordinator of Disability Services
- The Registrar

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, linear regression); 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.

Schedule of Experiments

| Week of | Experiment |
|------------|---|
| Sept. 1 | Introduction: Check-in, Safety Lecture, Excel Tutorial |
| Sept. 8 | 1: Identification of a Metal Carbonate |
| Sept. 15 | 2: UV-vis Spectroscopy of Dyes – part 1 |
| Sept. 22 | 2: UV-vis Spectroscopy of Dyes – part 2 |
| Sept. 29 | 3: Equivalent Weight of an Organic Acid |
| Oct. 6 | Reading Days (no lab this week) |
| Oct. 13 | 4: Synthesis of a Coordination Compound – part 1 |
| Oct. 20 | 4: Synthesis of a Coordination Compound – part 2 |
| Oct. 27 | Mid-term Exam 5: Thermochemistry: Synthesis of Biodiesel – part 1 |
| Nov. 3 | 5: Thermochemistry: Synthesis of Biodiesel – part 2 |
| Nov. 10 | 6: Analysis of Cobalt Coordination Compounds |
| Nov. 17 | 7: Donor Atom Preference in Cobalt (III) Complexes – part 1 |
| Nov. 24 | Thanksgiving Break |
| Dec. 1 | 7: Donor Atom Preference in Cobalt (III) Complexes – part 2 |
| Dec. 8 | 8: Introduction to Computational Chemistry: Molecular Geometry and Energy |
| Dec. 15-19 | Final Exam — day and time varies for each section |