



EAST TENNESSEE STATE
UNIVERSITY

College of Arts and Sciences

Department of Chemistry

CHEM 3611 Introductory Integrated Lab

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Course Outline: CHEM 3611 is designed to strengthen a student's understanding of how theory and knowledge of a system guide experimental design and determine limitations of results and how they can be interpreted. This course also aims to build technical writing skills and communication of experimental results and their importance. Emphasis is placed on developing proficiency in handling chemicals, equipment, and instrumentation found in lab, as well as recording, processing, interpreting, and presenting experimental data.

Required Materials: Splash-proof goggles (available at ETSU bookstore)
Knee-length lab coat with long sleeves
Appropriate lab attire (full coverage of legs and feet)
Carbon-copy notebook (example: National No. 43-649 or 43-647)
Pens (blue or black ink) for recording notes & data
USB flash drive (for saving data from lab computers)

Course Policies:

Attendance - It is the responsibility of the student to attend each class and to arrive on time. There will be no make-up experiments except in extenuating circumstances. If you must miss a class, arrangements should be made with the instructor before the class. Written documentation (e.g. a doctor's note) must be provided as an excuse. For any unjustified absence, a student will receive a grade of 0 for the scheduled experiment that was missed. Students must arrive to lab on time and well-prepared. All experiments must be stopped 15 min prior to the end of session to begin clean-up. There will be a 10% grade deduction from the report for any experiment for which the student is late for class or not prepared, does not leave on time, or does not clean up.

Laboratory Work - Experiments are detailed in the course lab manual available on D2L and will be performed on a rotating basis except as noted in the schedule. Students will work individually or in pairs to complete experiments. A lab schedule will be posted on the lab door and on the course website. It is the responsibility of the student or pair of students to prepare for the assigned lab activity in advance. Pairs or groups of students will complete lab

work together but are expected to record notes, perform calculations, and write reports individually.

Safety - All students registered for the lab must complete safety training (see the D2L course site for details). Any student who does not complete safety the safety quiz by **Friday, August 30** will be dropped from the laboratory. If this course is dropped, it can have an effect on some forms of financial aid.

Assignments - Each student must turn in 10 lab reports.

Lab Reports: Lab reports are due one week after the completion of the experiment. Any report submitted after it is due will be penalized with a 20% grade deduction for up to one week. A grade of 0 is assigned for reports that are overdue more than one week. Lab reports are to be submitted through Dropbox folders (labeled with the appropriate due date) in D2L. Scores on the 10 lab reports will count towards 80% of the course grade.

Final Exam: A final exam featuring questions directly related to the semester's lab work and chemical concepts will be given at a location and date to be announced. The final exam will count towards 20% of the course grade. The final exam is required. Failure to take the exam will result in a grade of F in the course.

Grade	Percent	Grade	Percent	Grade	Percent
A	91-100	B-	74-77	D+	58-61
A-	86-90	C+	70-73	D	54-57
B+	82-85	C	66-69	F	<54
B	78-81	C-	62-65		

Schedule

August 26	Introductory Lecture (Location: Brown 177) – Safety, Overview, Concepts
September 9	Begin Experiments
TBA	Final Exam

Department Policies:

Academic Honesty - Any act of academic misconduct will result in a **grade of zero on the assignment** and will be **reported to the Chair of the Department**. Offenders are also subject to **other consequences** as outlined in the **Policies and Procedures section of the ETSU Graduate Catalog**.

Accommodations - Any student who needs an accommodation should inform the instructor at the beginning of the course. Faculty accommodation forms are provided to students through Disability Services in the D.P. Culp center, telephone 439-8346.

Mental Health - Students often have questions about mental health resources, whether for themselves or a friend or family member. There are many resources available on the ETSU Campus, including: ETSU Counseling Center (423) 439-4841; ETSU Behavioral Health & Wellness Clinic (423) 439-7777; ETSU Community Counseling Clinic: (423) 439-4187.

If you or a friend are in immediate crisis, call 911.

National Suicide Prevention Lifeline (Available 24 hrs/day): 1-800-273-TALK (8255)

This syllabus is a tentative course plan for CHEM 3611. Any change or amendment to this syllabus will be made available through the course D2L website and accompanied by an alert on the course D2L website homepage and an in-class announcement.

How to keep a notebook

You are required to have a bound laboratory notebook that is to be used for pre-lab preparation (e.g. chemical equations of the reaction to be performed, physical constants for reagents and products, etc.), and for recording your data and observations during the laboratory period. Your notebook is also the primary source from which individual short reports and formal reports are prepared. You must choose a notebook that has sewn-in pages (NOT a spiral notebook or loose-leaf paper), and you should reserve the notebook only for organic lab. A standard composition notebook is ideal for this purpose.

It is essential that you carefully plan for each experiment before attending lab. Read all assigned background material in the text and prepare appropriate notes in lab notebook.

If you were working in a research laboratory, your lab notebook could be the most important scientific document that you write. In legal cases, it is treated as a legal record of your experiments, and is sometimes used to prove when and how you conducted the experiments. Although we doubt that your organic lab notebook will ever appear as evidence in a court of law, we want you to keep a good notebook that is an accurate, permanent record of what you have done in the lab.

A laboratory notebook should be legible, and data in it should be readily accessible, clearly labeled with units, and grouped in a logical way. The following outline is suggested:

- 1. Objective.** State the purpose of the experiment along with a brief statement of basic principles involved and the method to be used.
- 2. Reference.** Cite the source for the experiment. It will suffice to reference the page numbers of the Lab Manual from which the procedure comes.
- 3. Experimental.** A complete experimental procedure for the assigned experiment must be written before coming to the lab. You have to follow your written procedure to carry out the experiment, you are not allowed to use the manual or hand-outs in the lab. Any student who does not have a procedure written in the notebook prior to the experiment may not be allowed to attend the lab on the day.
- 4. Sample Calculations.** Sample Calculations or Analysis Flowchart or Outline. Before coming to lab, write in your notebook a description of the calculations that you will perform to analyze your data. This can be in the form of a sample calculation or a flowchart or outline. Note that in weeks when no calculations are required, this section is omitted.
- 5. Class Notes.** Neat and organized class notes taken during the pre-lab lectures. This may include theoretical background of the experiment, safety precautions, modification of procedure,
- 6. Data and Results.** Qualitative observations and quantitative data are best entered in a running commentary. This commentary should be recorded in the lab, as the experiment proceeds. High prose standards are not expected. If repeated measurements are made using the same procedure, a table provides the best presentation. If the experimental work is done jointly it must be noted and reported independently. Your notebook must list your co-workers and identify who did what.

Calculated results are also included in this section. Write your calculations clearly and include a brief

explanation for each step. Remember to include units. If the same calculation is done repeatedly, write one sample calculation in your notebook and report the results of other calculations in a table. If an uncertainty analysis is part of your lab write-up, it should be included in this section, with sample calculations.

7. Discussion. A discussion of the experiment should include qualitative and quantitative comments on your results. Calculations of precision, accuracy, and possible explanations of any obvious errors may be appropriate. It is often helpful to collect your results in tabular form. Questions posed in the description of the experiment in the Manual should also be answered here. An example discussion for the density experiment is shown in the sample write up in the lab manual.

Note 1. Steps 1 through 4 will be done before coming to lab lecture for the week's experiment.

Note 2. A logical tabular form for your data will often be the clearest presentation. You should construct these tables in the lab, as you obtain the data, as part of step 6.

You have some leeway in how you prepare the notebook, but the following hints should be considered:

- A clear Table of Contents should appear on the first few pages. All pages must be numbered in sequence. All experiments must have titles and dates they are performed. Upon completion of each experiment, sign and date the last page of the experiment.
- A ballpoint pen with non-erasable ink is preferred. All errors must be crossed out with a single line, no scribbles or white-out!
- No pages must be missing; do not remove any pages. Pages can be crossed out with an (X) if the entire page is incorrect. Avoid leaving any pages blank. Use front and back of each page.
- Data and associated graphs and calculations that quantitatively gauge how successful your laboratory technique was.
- Enough explanatory information so that someone else with your knowledge of chemistry could, from your notebook alone, enter the lab and repeat your work.
- Your discussion and answers to questions raised from time to time in the laboratory manual itself. In view of the fact that a notebook is a primary record, data are not copied into it from other sources (such as this manual or a lab partner's notebook, in a joint experiment) without clear acknowledgment of the source. Observations are never collected on note pads, filter paper, or other temporary paper for later transfer into a notebook. It is important to develop a standard approach to using a notebook routinely as the primary receptacle of observations.

