CHEM 111.02B Lab Syllabus

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class meetings:
Tuesday 2:10 – 4:00 pm Caputo Hall 328
office hours: M 7:50–8:50 am; 11:50 am – 12:50 pm; T&R 7:50 – 9:20 am

LABORATORY MANUAL
Permanently bound notebook (spiral or ring binders are not acceptable). Bound notebooks are available in the campus bookstore, on-line, or at retail stores.

SUPPLEMENTAL MATERIAL
Handouts will be posted on your CHEM 111 lecture D2L course. You must print them out and read them before lab. Calculator with root function, logs, and antilogs will be useful for lab exercises. Required: Safety goggles and close-toed shoes.

COURSE OBJECTIVES
1) To provide the student with an empirical insight into the principles of chemistry.
2) To develop an ability in the student to learn and work with a team of peers.
3) To develop in the student an appreciation for safety and environmental sensitivity.
4) To illustrate, in a laboratory setting, the fundamental laws of chemistry.

INSTRUCTIONS FOR LABORATORY EXERCISES
Please arrive on time, as you will not be given extra time to finish the experiment beyond the designated time. Read about the experiment before coming to lab. It is unsafe and inefficient to read the handout, for the first time, as you are performing the laboratory experiment. All pre-lab worksheets are due at the beginning of class and are worth five points each. If the experiment performed is a continuation from the previous week, there will be no pre-lab worksheet. The pre-lab worksheets can be found on D2L. No pre-lab worksheet is due during the first week of classes.

Data sheets with complete calculations are due at the conclusion of each lab. It is expected that all students will complete all laboratory exercises, and all labs will count toward the final lab grade as described below. The data sheets are worth 8 points each and you will be graded on the precision and completeness of your answers.

RECORD-KEEPING IN THE LABORATORY
To properly apply the scientific method, you must record all laboratory observations in a bound notebook in great and graphic detail (pretend you are Leonardo da Vinci; mirror script is optional). The notebook should have a table of contents at the beginning, containing the experiment title, the page on which each experiment begins, and the date(s) during which the experiment was performed. The pages should be numbered, and no pages should ever be removed from the notebook. At the beginning of a new experiment, write a few sentences in the notebook about the purpose of the experiment, the method used, and any partners with whom you will work.
Mistakes are indicated by a single line drawn through them, never by obliterating them beyond recognition, since experimenters often decide later that what was thought to be a mistake was not really a mistake. Observations and data should be recorded directly into the notebook as you are performing the experiment. Do not write on paper towels or scrap paper and transfer to the notebook later. This would defeat the purpose of the notebook as a primary source of data. Organize your notebook beforehand when possible by labeling and leaving blanks for experimental parameters that must be recorded, and by making tables for data ahead of time. If you are unsure whether a piece of information should go into the notebook, write it in there. You cannot have too much information. If you have misgivings about the accuracy or precision of the data, or if something went wrong during the experiment, write that in the notebook as well. Later, you will not remember which data you trust and which you do not. Explanatory notes, units, and labels are always important, as is legibility.

GRADING
The maximum number of points for the lab portion of your grade are as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notebook</td>
<td>40</td>
</tr>
<tr>
<td>Data sheets (9)</td>
<td>72</td>
</tr>
<tr>
<td>Pre-lab worksheets (8)</td>
<td>40</td>
</tr>
<tr>
<td>Lab Practicum</td>
<td>48</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
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ATTENDANCE
Attendance is necessary in all lab meetings. If you cannot attend lab, due to serious illness or other emergency, you must contact me before the class period begins.

TENTATIVE LAB SCHEDULE
- **August 24** – Discuss syllabus & laboratory safety. Check into lockers. Density (exp1)
- **August 31** – Composition of a Hydrate (exp2, part A)
- **September 7** – Composition of a Hydrate (exp2, part B)
- **September 14** – Identification of Common Chemicals (exp6)
- **September 21** – Continuation of Identification of Common Chemicals, continued
- **September 28** – Titration of Acids and Bases (exp7, part B)
- **October 5** – Gravimetric and Volumetric Analysis (exp8, parts A&B)
- **October 12** – Fall recess; no lab exercises scheduled
- **October 19** – Continuation of Gravimetric and Volumetric Analysis (exp8, part C)
- **October 26** – Evaluation of the Gas Law Constant (exp10)
- **November 2** – Thermochemistry: Heat of reaction (exp11)
- **November 9** – Spectrophotometric Analysis of Commercial Aspirin (exp12)
- **November 16** – Spectrophotometric Analysis of Commercial Aspirin, continued
- **November 23** – Molecular models and bonding (exp13)
- **November 30** – Laboratory practicum and checkout (exp6)
- **December 7** – Final exams; no lab exercises scheduled