Instructors:
Dr. Jamie Young: Lab Coordinator and Instructor for Sections 01, 02, 04, 05, 06 and 07
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Office hours: M, Tu and Th (4 - 5.30 p.m.) in UTL 285 or by appointment

Dr. Sunita Thyagarajan: Instructor for Section 03 (Wednesday)
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Office Phone: (410) 516-7864
Office hours: Wednesday (2 – 3 p.m.) in UTL 288 or by appointment

TA help sessions: Mon – Fri evenings from 6:30 - 7:15 p.m. in Remsen 233. These help sessions are purely for questions pertaining to 105. Use these sessions for help with pre- and post-labs.

Co- or prerequisite: AS.030.101 must be taken concurrently or previously.

Required materials:
● Lab notebook with duplicate pages (available for purchase at the JHU bookstore or elsewhere).
● ANSI Z-87.1 compliant chemical splash safety goggles (available for purchase at JHU bookstore or elsewhere).
● Chem21Lab (http://www.chem21labs.com) available on-line after check-in. The cost will be $20.00 for the semester. This includes the manual and the on-line program for pre- and post-lab assignments.

Course objectives:
The experiments in this course are designed to support the learning of topics taught in AS.030.101 alongside develop basic laboratory skills. They will provide students with a visual understanding of some of the key concepts of general chemistry and practice applying concepts to experimental procedures, observations, and results.
● The concepts from AS.030.101 that are supported include:
  ○ Observing chemical reactions and calculating percent yields.
  ○ Applying concepts of real and ideal gases to experimental analysis.
  ○ Understanding thermodynamic and equilibrium concepts through analysis of laboratory observations.
● Laboratory skill development includes
  ○ Working with a lab partner to develop collaboration skills
  ○ Understanding and following appropriate procedures for safe handling and disposal of toxic and corrosive chemicals.
  ○ Correctly using glassware for volume measurement.
  ○ Using vacuum filtration to separate solids from liquids.
  ○ Accurately reporting results, including the proper use of a laboratory notebook and appropriate use of significant figures.
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Department of Chemistry  
AS 030.105 Introductory Chemistry Laboratory Fall 2019

- Graphically analyzing results and using a spreadsheet program for data analysis.
- Recognizing uncertainties and errors in experiments that arise from the procedures and assumptions.

**Experiments:**
1A. Check-in and Egg Density  
1B/C. Scientific Measurements  
2. Synthesis of a Nickel Compound – Stoichiometry  
3. Copper Chemistry – Study of Different Types of Reactions  
4. Determining Molar Mass – Freezing Point Depression  
5. Calorimetry and Hess's Law  
6. Enthalpy of Vaporization of Water  
7. Thermodynamics of Borax Solubility

**Attendance:**
Students must attend their registrar-scheduled lab for all experiments. Make-ups will only be permitted due to illness, religious holidays, or JHU-sponsored athletic events, not for vacations or because you have an exam the next day. A maximum of 2 make-ups per semester for experiments will be allowed without grade penalties. Lab assignments will be due exactly one week from when the makeup experiment is performed. Requests for scheduled reasons must be received a week before the regular time of the lab and the make-up must be scheduled for a lab period with the same experiment. Requests due to illness must be received prior to your regularly scheduled lab time and made up as soon as possible. No make-ups will be approved for early departure for, or late arrival from, the Fall break or the Thanksgiving break.

*All requests for lab make-ups must be submitted on the form through Blackboard.*

- **Lab tardiness:** Students are expected to arrive on time, dressed appropriately for lab. Tardiness will result in lost points, -2 points per 10 minutes late. Also, you will perform the lab by yourself since your regular lab partner will be assigned a temporary partner for the day. You may not join a group that has already started. You may not stay beyond the end of the scheduled lab period. Students more than 30 minutes late will not be allowed to complete the days experiment and will get a 0 for that lab.
- **Inclement Weather/University closures:** If the university closes for inclement weather or any other reason, please check Blackboard for instructions. All electronic assignments will be due at their regular day/time even if the university is closed.

**Practical Assessments:** There are three lab practical exams during the semester, as shown on the schedule. They are designed to assess your individual practical abilities - further details will be given over the course of the semester. If you are ill, you must notify your instructor BEFORE the time of the exam. You must also obtain documentation of the illness from the Health and Wellness Office within 24 hours of the test time. A make-up exam will be scheduled. It is not acceptable to miss a practical due to illness and then still attend or take a test in another course on the same day. There is no comprehensive final for this course.
**Homework:** Dates for the experiments and due dates for pre- and post-lab homework are listed on the schedule in the back of the manual and on Blackboard. **All electronic assignments are due 30 minutes prior to your regularly-scheduled lab time.**

- **Pre-lab homework:** Before each experiment there will be a graded pre-lab homework assignment on Chem21Labs. No extensions will be given for pre-lab exercises.
- **Chem21Labs post-lab assignments:** Each experiment has a post-lab assignment on Chem21labs due as shown on the schedule. There is a 5% penalty for assignments submitted within 6 hours after their due date/time and a 10% penalty for assignments submitted within 24 hours after their due date/time. Any further extensions must be discussed with the instructor and may result in larger point deductions.

**Safety:** Safety training is required in order to complete this course. The university provides this training using an on-line safety course. To access this course, please follow these instructions carefully:

- Sign in to [http://my.jhu.edu](http://my.jhu.edu)
- Click on “Education” → “myLearning”.
- Use the catalog search box to find “Laboratory Safety Introductory Course”.
- After completing the course, you will be able to print out a “Certificate of Completion”.
- Print a copy of the certificate to give to your TA at the start of Experiment 2, as shown on the schedule.

*You will not be permitted to do further experiments until the safety course is completed and you will not be permitted to make-up labs you miss due to not completing the safety course.*

**Chem21Labs:** All pre-lab and post-lab assignments are completed on Chem21Labs. You will be enrolled after you check-in to the lab and get your drawer key. The on-line fee for this third-party program includes the fee for the hard-copy of the lab manual. Instructions for using this program are in Section VI in the manual and on Blackboard. The lab instructions from the manual and reference information are available from within the program via links at the top right of the page. Please read this carefully. Re-grade requests will not be accepted for student mistakes in data entry since you can change the data in the program. In addition, no re-grade requests will be accepted for rounding errors caused by entering values with a different number of digits in Chem21labs than in your calculator or spreadsheet.

Post-lab assignments provide immediate feedback on your calculations. The program allows three tries to get the correct answer. **The 1st attempt will occur no point deduction**, but an incorrect 2nd attempt will result in a 50% reduction for your 3rd try. There are often hints provided for the 2nd and 3rd tries. You will be able to attend a help session if you get an answer wrong on the first try as long as you start the assignment by the evening before it is due. If you get an answer wrong all three times, the program will provide you with the correct answer so you can continue with the assignment. It will also show you the formula it used.

**Blackboard:** The course website has important resources. It is used for announcements, course materials, discussion forums, grades, and on-line lectures.
Videos: There is a recorded orientation lecture and every experiment has a recorded on-line pre-lab lecture. The videos are posted on the Blackboard site under the ‘Experiments’ tab. There are also a number of videos highlighting important laboratory techniques and experiments that you are required to watch before lab.

General and experiment-specific information: There is information about graphing, significant figures, and error analyses as well as specific information that will be helpful with your experiments.

Practice problems: For each experiment, practice problems are available on Blackboard to help with the numerical calculations in the homework and on the lab practicals. They are not graded. They include feedback for how to do the calculations correctly.

Notebook: You are required to use a laboratory notebook with duplicate pages for recording your data and observations. All students must keep their own notebooks. You will turn in the duplicate pages at the end of each lab period and they will be graded. A lab notebook is very different from just taking notes in lecture since it is not just for you. Another person with a similar technical background should be able to repeat your experiment and obtain exactly the same results just from what is in your notebook. Since science is evidence-based, your laboratory notebook should provide evidence of how you performed the experiment and what equipment you used as well as your observations and experimental results. In research, your laboratory notebook forms a permanent record of your research and inventions and it can provide crucial documentation in patent considerations. Further information, including a sample of how to organize your notebook, is posted on Blackboard.

Grades: The gradebook on Blackboard will include grades from your Chem21Lab assignments, your notebook and in-lab worksheet grades, and your test grades. Grades will be calculated as follows:

- 20% from the sum of the pre-lab scores
- 50% from the sum of the post-lab assignments, notebooks, and in-lab worksheets
- 30% from the sum of the exams (10% for each test).

Final grades will be determined on the following scale:

<table>
<thead>
<tr>
<th>Percent score</th>
<th>Final grade</th>
<th>Percent score</th>
<th>Final grade</th>
<th>Percent score</th>
<th>Final grade</th>
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<tbody>
<tr>
<td>94+ %</td>
<td>A</td>
<td>82-86 %</td>
<td>B</td>
<td>70-74 %</td>
<td>C</td>
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<tr>
<td>90-94 %</td>
<td>A-</td>
<td>78-82 %</td>
<td>B-</td>
<td>66-70 %</td>
<td>C-</td>
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<td>86-90 %</td>
<td>B+</td>
<td>74-78 %</td>
<td>C+</td>
<td>60-66 %</td>
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Grades below 60% are failing.

All requests for regrades for this course must be submitted using the form available from your TA and on Blackboard. They must be received within one week of when you receive the graded assignment. Your entire assignment will be regraded, which could result in lower grades. TAs may not change grades. The instructors will not discuss grade changes until after review of the written request.