

Organic Chemistry Lab II (Chemistry 322L, 1 credit) Syllabus

Organic Lab Coordinator: **Dr. Andrea Drew Gounev**
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 Office Hours M 12:00pm-1:00pm (in my office), and by appointment
 through UMKC Connect in Canvas
 Course Format: Laboratory
 Course Instructional Mode: *P (classroom (lab) based)*

Course Website: <http://d.web.umkc.edu/drewa/Chem322L/index322L.html>

| Meets | Day | Time | Teaching Assistants (Office Hours on Canvas) | Instructors in charge |
|---------|-----|--------------------------------|---|-----------------------|
| SCB 385 | M | 2:00 - 4:50 PM (V01 11603) | Reid Brenner (brennerre@umkc.edu) Nash Harvey (nth698@mail.umkc.edu) | Dr. Drew Gounev |
| SCB 385 | T | 8:00 - 10:50 AM (V02 11604) | Reid Brenner (brennerre@umkc.edu) D. Emma Helm (dehkf4@mail.umkc.edu) | Dr. Drew Gounev |
| SCB 385 | T | 2:00 - 4:50 PM (V03 11605) | John Zhou (jzqb9@mail.umkc.edu) Mark Abnos (mman8c@mail.umkc.edu) | Dr. Drew Gounev |
| SCB 385 | W | 2:00 - 4:50 PM (V04 11606) | John Zhou (jzqb9@mail.umkc.edu) Rylie Schellhardt (rcsgwx@mail.umkc.edu) | Dr. Drew Gounev |
| SCB 385 | R | 8:00 - 10:50 AM (V06 11607) | Michael Wiles (mwwn9c@mail.umkc.edu) | Dr. Drew Gounev |
| SCB 385 | R | 2:00 - 4:50 PM (V07 15607) | Dr. Robert Clevenger (rgcdcb@umkc.edu) Buwanila Punchihewa (btpgm7@mail.umkc.edu) | Dr. Drew Gounev |

COURSE INSTRUCTIONAL MODE and FORMAT:

This 1-credit hour LAB course consists of a prelab video that students must watch prior to coming to lab, followed by a laboratory session in SBS 385 (P (classroom based)).

CATALOG DESCRIPTION and RESTRICTIONS

CHEM 322L is an extension of CHEM 321L. CHEM 322L builds from the basic techniques, procedures, and writing to more advanced organic operations. Prerequisite: CHEM 321 and CHEM 321L or equivalent (each with a C- or better) Corequisite CHEM 322R; Restrictions/Exclusions: None; Offered: Each Term. Course Attributes: None.

SOME IMPORTANT DATES FOR SPRING SEMESTER 2020:

- January 21** Coursework Begins.
February 17 Last day to file for May graduation.
April 17 Last day to withdraw **without** assessment. After this date, you have to petition to withdraw from the course.

STUDENT LEARNING OUTCOMES

Upon completion of Chemistry 322L, students should be able to:

- Apply knowledge obtained in Chem. 322 lecture to problem solving and critical thinking in the laboratory.
- Utilize mathematical knowledge gained from general chemistry to perform common calculations, including mass balance, limiting reagent, and percent yield.
- Engage in safe laboratory practices by handling laboratory glassware, equipment, and chemical reagents appropriately, using general guidelines and basic knowledge about the common hazards associated with them in an organic chemistry laboratory.
- Maintain an appropriate scientific notebook using notational and descriptive content containing MSDS information on relevant chemical reagents, experimental procedure followed, data collected, and observations made during the experimental process.
- Assemble glassware and perform the following techniques as a part of synthetic procedures: aqueous workup, distillation, reflux, separation, isolation, and crystallization.
- Predict the outcome of several common organic reaction types through a basic understanding of starting materials, functional groups, mechanism, and typical reaction conditions.
- Characterize prepared substances by physical and spectroscopic means.
- Develop the skill set necessary to continue on to upper level chemistry labs.
- Communicate with other scientists through the writing of a formal scientific paper.

GENERAL**Pre-requisites and Co-requisite**

A grade of “C-” or better in Organic Chemistry I with lab (CHEM 321/321L), or the equivalent courses, is required for enrollment in this course. The co-requisite is CHEM 322 Lecture.

Course objectives

The objective of this course is to provide students with advanced organic laboratory experiences, i.e., performing multi-step organic syntheses and writing scientific reports.

Pre-lab lectures and announcements

All classes will convene in room BSB 385 in the Biological Sciences Building for class announcements, pre-lab lectures, and submission of lab reports. Attendance will be taken in pre-lab.

Required materials

- Mohring et al. Techniques in Organic Chemistry, 4th ed.; 2014, W.H. Freeman (ISBN-10: 1464134227 and ISBN-13: 9781464134227). This may be purchased from the UMKC Bookstore.
- A lab notebook capable of making carbon copies (100 pages is a good size). The copies are submitted to your GTA as you leave the lab each session and become part of your report; you retain the originals.
- Padlock, safety glasses, black felt-tip pen with permanent ink (Sharpie).
- Non-graphing calculator (as the one you used in General Chemistry I and II).
- Appropriate clothing (i.e., no shorts, open-toed shoes, etc.).

GRADING/ASSESSMENT

During the pre-lab lecture, the GTAs will tell you what you need to hand in for your report on that lab. You will turn in *eight* regular lab reports, **each worth 20 points**. Your lowest lab report score will be dropped (*if you have an "excused" lab, it will your dropped lab*), for a total of **140** points for your reports. The ninth and tenth labs, **Diels-Alder Reaction: Hexaphenylbenzene, Dimethyl tetraphenyl phthalate, 1,2,3,4-Tetraphenylnaphthalene** and **Diels-Alder Reaction: Triptycene** (lab numbers 3 and 4 on the syllabus) have an extended lab write-up and cannot be dropped.

Laboratory Performance and Technique: Part of the grade for each lab report will include a score for laboratory performance and technique. You are expected to be prepared for lab, maintain your drawer, space and wastes appropriately, wear safety goggles/glasses at all times while in the lab, and follow all check-in and check-out procedures. You will have points deducted for tardiness, lack of preparation, non-completion of lab or other infractions of safety and good lab practice.

Extended Laboratory Write-Ups:

The first extended laboratory write-up will be over the Experimental Part of the Diels-Alder experiments and is worth **20 points**. It will NOT be submitted through TurnItIn in Canvas!

The second extended laboratory write-up will also be over the same Diels-Alder experiments, but will be a full write-up including an Introduction, revised Experimental Part, Results and Discussion, Conclusion and Bibliography. The second laboratory write-up is worth **50 points**. A Tegrity lecture that explains the kinds of information you need to include in both of these labs and some additional information can also be found on the course website. You will be submitting a hard copy of the extended lab report to your lab TA, as well as submitting it to TurnItIn through Canvas.

Diels-Alder Full Paper: You will submit a hard copy to your TA during your lab time. You will ALSO submit your full paper (not just the experimental write-up) through Canvas to TurnItIn.com. This is how the entire process will work:

1. You will turn in a hard copy of your complete experimental write-up to your TA on your lab date (see lab schedule for dates).
2. Before midnight on your lab day during the week the experimental write-up is due, you will also login to Canvas and submit your complete experimental write-up.
3. Here are the directions for uploading your experimental write-up:
 - a. Sign in to the Canvas CHEM 321L course site.
 - b. Click on the title of the assignment you need to submit on the **Assignments** link in the left-hand course navigation menu.

▼ Upcoming Assignments



8. Substitution Reactions SN1: triphenylmethanol

Available until Nov 9 | Due Nov 9 at 11:59pm | -/30 pts

- c. Click the **Submit Assignment** button.
- d. Click the **Choose File** button to upload a file from your computer. When the file window appears, locate and click the name of the file. At the bottom of the window, click the **Choose** or **Browse** button (depending on your browser).

e. Click the **Submit Assignment** button.

4. If you do not turn in a hard copy of your experimental write-up to your TA AND submit it to TurnItIn.com (Canvas) you will receive a “0” for this assignment.

Friday Evening Laboratory Exam:

There is one cumulative laboratory exam (covers all 10 experiments), **worth 50 points**, which will be held on a Friday evening. Please mark it in your calendar and bring a calculator. There are no alternate exam times, so please plan accordingly.

▶▶▶ **LAB EXAM: MAY 1 (Friday) from 4:00pm-5:00pm in Royall Hall 111.**

Grading Detail:

| Assignment | Total | |
|------------------------------------|------------|--|
| 8 Lab Experiments (20 points each) | 140 | (Dropping lowest score) |
| First Extended Lab Report | 20 | (Experimental Section from Labs 3 and 4) |
| Second Extended Lab Report | 50 | (Diels-Alder Paper) |
| Lab Exam | 50 | |
| TOTAL POINTS POSSIBLE | 260 | |

The total amount of points for this class will be **260** points. Grades will be assigned as follows:

| | | |
|--------------------|-----------------|-----------------|
| 90% and above = A; | 80 – 89.9% = B; | 70 – 79.9% = C; |
| 60 – 69.9% = D; | below 60% = F. | |

Note: You will lose 1 point on anything that you hand in as a lab report for the first occurrence of the following: a spelling error, grammatical error, and partial sentence. Spell-check and proof-read your typed work.

Your lab grades may be checked via Canvas at Canvas.umkc.edu. Your Canvas User ID and Password are the same as your UMKC Exchange/SSO user ID (the alias from your Alias@umkc.edu e-mail address). If you don't know your Exchange/SSO User ID, you can obtain it at www.umkc.edu/exchange-faq. Lab handouts may also be found on the Canvas site or at the Chemistry 322L course website, which is <http://d.web.umkc.edu/drewa/Chem322L/index322L.html>.

Enrollment and Attendance

You must be enrolled in the section you are attending. If you are not enrolled by the end of the second week of classes (January 31st), you will be asked to leave the lab. **Attendance is required and will be taken by GTAs at all laboratory classes. The class starts on time and finishes on time. Please observe the following:**

- Students must attend their assigned laboratory section.
- Only substantial and unavoidable reasons (e.g., serious illness, unavoidable out-of-town professional travel, death in the family, or religious observance) should cause students to miss a regularly scheduled lab. You should not miss a lab simply because your lowest score will be dropped!
- **There will be no make-up labs!** All of the organic lab sections are completely full. Even if you have an excused absence, you will be unable to make-up the lab you missed. This will be your dropped lab.
- Things such as doctor/dentist appointments should be scheduled outside of lab times.
- Travel arrangements for holidays and vacations should not be allowed to interfere with your class attendance.

Safety and Honesty

During the first week of classes, safety regulations will be reviewed. You are expected to follow them. When in doubt, ask your GTA or lab instructor. Do not, under any circumstances, use fabricated data or data from another student (past or present). Fabrication of data is academic misconduct, as is plagiarism, cheating and sabotage: you will receive a grade of zero on the tainted work and will be reported to the Chief Academic Officer of your academic unit. Serious and/or repeat offenders will receive an "F" grade for the course and face disciplinary action from the University. It is your responsibility to know and uphold the UMKC rules of academic conduct (<https://catalog.umkc.edu/special-notice/academic-honesty/>).

The Board of Curators of the University of Missouri recognizes that academic honesty is essential for the intellectual life of the University. Faculty members have a special obligation to expect high standards of academic honesty in all student work. Students have a special obligation to adhere to such standards. Academic dishonesty, including cheating, plagiarism or sabotage, is adjudicated through the [University of Missouri Student Conduct Code](#) and [Rules of Procedures in Student Conduct Matters](#). It is your responsibility to know and uphold the UMKC rules (and those of your academic unit) of academic conduct.

During the check-in week of the lab, you will be asked to sign a statement that you understand the safety regulations and academic honesty policy, and agree to adhere to them. A copy of these regulations is provided.

Laboratory

You must provide a padlock for your glassware drawer. You are responsible for maintaining the glassware clean and in good condition and for keeping your equipment drawer clean. Even though you are expected to take appropriate care with equipment and glassware, it is reasonable to expect a small amount of breakage. Notify the GTA as soon as possible if something is broken; you will be issued a replacement. No student will receive a grade for the course until he/she has checked out at the end of the semester.

Lab Reports

The due dates for lab reports are listed in the class schedule accompanying the syllabus. Lab reports must be turned in at the beginning of the pre-lab lecture prior to entering the laboratory. **Late lab reports will never be accepted.** No exceptions will be made. However, IF you miss a lab and a report was due that day (from the lab you did the week before), you have extra 2 days to bring that lab directly to MY OFFICE.

Regrade and Grievance Policy

Regrade requests for the lab reports should be submitted to the GTA as soon as possible, and **no later than within one week of receiving the graded lab report.** The GTA may decide to pass certain regrade

requests to the instructor. Any other grievances about the class should be first taken up with the instructor. After contact with the instructor, further comments and complaints may be addressed to the Chemistry Department Chair. **Please know that if you copy postlab answers from other students, Google, or paid websites like Chegg, Course Hero, etc., you will automatically receive a 10/20 for your lab grade (first offense). After that additional measures will be taken! If you plagiarize your Diels-Alder experimental write-up or paper, you will be given a zero for the assignment and additional measures may be taken.**

LAB NOTEBOOKS

- Reread pages 32-40 in Mohrig et al.
- Each experiment should begin on a new page.
- *Put your name, your section, your TA's name on top of every page in every experiment.*
- Make every entry in your notebook in ink, never in pencil. Do not erase or black out entries. Instead, ~~draw a line through the error~~ and add the new information.
- Record all laboratory observations and data directly in the lab notebook at the time they are observed. Do not use scratch paper. Do not expect to transcribe any information into your notebook at a later time. Carbon copies of your notebook entries should be stapled and handed in at the end of every laboratory session. Your typed reports must draw on data and observations recorded in your lab notebook.
- Organize your lab notebook using headings such as *Title, Purpose, Procedure, Observations, Apparatus or Glassware set-up, Balanced reaction or Mechanism, and Purification.*
- Do not, under any circumstances, use fabricated data or data from another student.

LAB REPORTS

For each experiment you will hand in (1) the carbon copies of pre-lab and data and observations pages from your lab notebook *before leaving the lab* and (2) a completed post-lab report from the previous week's lab, *on the scheduled due date, before leaving the pre-lab*. Your report will consist of these two submissions.

Your pre-lab assignment and lab notes/observations will be **handwritten in pen**; your post-lab report should be **typewritten**, with the exception of structures and mechanisms, which should be hand-drawn in pen. Anything in pencil will not be graded.

The individual lab handouts will be available for download at the course website and you can type directly on them. They will be up the Monday before the week of that lab. Please make sure that all calculations in your post-lab report show all your work! When you are showing limiting reactant calculations, the mole-to-mole ratio between the reactant and product must be clearly shown!

*Also please note that in post-lab reports, numbers should never begin with a decimal and units must be given (even if they are implied)! Additionally, melting points that are measured are given as a range, not as a single temperature, and are reported in °C. An example is:

| | |
|--|------------|
| Initial weight of salicylic acid | 0.198 g |
| Volume of water used to recrystallize salicylic acid | 2.50 mL |
| melting point of compound above (°C) | 158-160 °C |

Before lab ⇒ Pre-lab

Pre-Lab Videos

Before each lab period, you are expected to watch a pre-lab video pertaining to that week's experiment. These videos were created by two former undergraduate students in an effort to better prepare you for organic lab and to enhance your learning experience here. Each week's video can be found under that week's lab at the course website <http://d.web.umkc.edu/drewa/Chem321L/index321L.html>. When you enter the lab, it is expected that you have already watched that week's video!

Pre-lab Assignment

You will need to write in the procedure fully in your lab notebook because the handouts will not be allowed in the lab. You should be thorough enough so that you can perform the experiment from what you have written. Any changes to the lab will be announced in the pre-lab lecture and need to be noted in your lab book. When you arrive in lab, your GTA will sign your notebook pages ensuring that you have completed the required pre-lab. If not, you will not be allowed to start the experiment. You will have to leave the lab, complete the pre-lab, and then return to the lab but all labs will stop by the end of the lab section. No time extensions are allowed.

The pre-lab in your notebook at a minimum should contain the following


- **Title:** Begin each experiment *on a new page* with a title, your name, the date, your TA's name and your lab section.
- **Purpose:** A brief statement of the experimental objectives
- **Net equation:** Include for all important reactions (found in handout).
 - **Table of quantities and physical constants:** Collect in tabular form the name, structure, formula, molecular weight, and density of any substance whose mass or volume you must measure (make sure you include units where appropriate!). Some of this information can be found in the handouts.

⇒ That which is not in the handouts can be looked up in *The Aldrich Chemical Company Catalog*, *The Merck Index*, *The CRC Handbook of Chemistry and Physics*, and on-line at <http://www.sigmaaldrich.com/united-states.html>. Click on SDS to see safety data sheet.

Search term: "salicylic acid" ✕

21 matches found for salicylic acid ☰ ☰ Sort By Relevance ▾

Salicylic acid
13 Product Results | Match Criteria: CAS Number Properties ▾

 Synonym: 2-Hydroxybenzoic acid
Linear Formula: 2'(HO)C₆H₄CO₂H | Molecular Weight: 138.12 | CAS Number: 69-72-7

| | | | | |
|--------------------------|--------|---|-------|-----------|
| <input type="checkbox"/> | S5922 | BioXtra, ≥99.0% (Sigma) | ◇ SDS | pricing ▾ |
| <input type="checkbox"/> | S7401 | plant cell culture tested (Sigma) | ◇ SDS | pricing ▾ |
| <input type="checkbox"/> | 247588 | ACS reagent, ≥99.0% (Sigma-Aldrich) | ◇ SDS | pricing ▾ |
| <input type="checkbox"/> | 84210 | puriss. p.a., ≥99.0% (T) (Sigma-Aldrich) | ◇ SDS | pricing ▾ |
| <input type="checkbox"/> | 27301 | meets analytical specification of Ph. Eur., BP, USP, 99.5-100.5% (calc. to the dried substance) (Sigma-Aldrich) | ◇ SDS | pricing ▾ |

- **Procedure:** Provide an outline of the experimental procedure to be carried out. Do not simply copy what is written in the handouts; use your own words and diagrams. It is often useful to construct a flow chart of the procedure. This is what you will use to complete your experiment, so make sure you can follow it!

Example of how to setup your lab notebook

Before the Experiment Begins. See <http://d.web.umkc.edu/drewa/Chem321L/index321L.html> and look under “lab notebook example” to see what your lab notebook should contain.

Experiment Title:
Course: Chemistry 322L

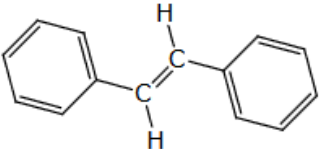
Date:
Section:

Name:
TA Name:

Purpose: (Purpose of the experiment; write a brief (1-3 sentences) statement of purpose for the synthesis or analysis, or state the question you are addressing)

Balanced Chemical Reaction: (Write balanced chemical equations that show the overall process, not a mechanism)

Table of Physical Quantities: (Include all reagents and solvents: name of reagent or solvent, molecular formula, molecular structure, molecular weight, melting point (solids) or boiling point (liquids), density, hazards). Water must ALWAYS be included!

| Compound | Molecular formula | Molecular structure | Molecular Weight (g/mol) | Melting or Boiling Point (°C) | Density (g/mL) |
|--------------------------------|---------------------------------|---|--------------------------|--------------------------------|----------------|
| <i>trans</i> -Stilbene | C ₁₄ H ₁₂ |  | 180.25 | mp 122-124 °C bp 305-307 °C | 1.74 |
| Ethanol | | | | | |
| 47% Hydrobromic Acid | | | | | |
| 30% Hydrogen Peroxide | | | | | |
| Sodium Bicarbonate | | | | | |
| 1,2-Dibromo-1,2-diphenylethane | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Name | Hazards (According to MSDS) |
|------------------------|---|
| <i>trans</i> -Stilbene | Harmful if swallowed; Irritating to the eyes. |

Procedure: (This is a procedural outline of what you are doing in the experiment. Remember, you will not be allowed to bring your lab report to class so it is important that you have the details of the experiment here. Leave space between lines here for any corrections that the GTA gives you to the procedures.)

During the Laboratory Session.**During lab ⇒ Data and observations (hand-written in your lab notebook)**

Maintaining good experimental records is an essential part of the laboratory work. For all experiments, record what was done, including amounts (in g or mL, and in mol or mmol) of the compounds used, and your observations (i.e., changes in appearance, color, temperature, precipitation, evolution of gas). Also, where applicable, include work-up, isolation, and purification techniques used, isolated yields (in g or mL and in percents), and appearance of the final product (physical state, color, texture, smell).

Carbon copies of these pages will be stapled together and submitted before leaving the lab. Failure to turn in those pages counts as an absence. If an absence for a lab is recorded, a grade of "0" is unavoidable.

Observations: Record all observations that take place while you are performing your experiment. This includes:

- Actual quantities of all reagents used.
- Amounts of crude and purified products obtained
- Mention measurements you took (temperature, time, melting point, and so on)
- Smells
- Color changes

After lab ⇒ Summary of results and lab report (typed; CANNOT be hand-written)

You will receive a list of what is required for that lab during your pre-lab lecture. You will need to type all of the information required. All calculations must be explicitly included and type-written. If your handout includes post-lab questions, type the answers to them in the appropriate space in "Post-lab Report". Figures, structures and mechanisms are to be hand-drawn in **ink** (not in pencil). Your typed reports will be cross-checked against your lab notes. Spell-check and proof-read your typed work (see GRADING).

Your post-lab reports will be collected on the date they are due, in the lab. Do NOT submit your lab reports to Chemistry Office!

RESOURCES AND POLICY STATEMENTS

Important UMKC Resources and Policies are applicable to every course and every student at UMKC. These are located in the Canvas site for this course under the "Help" tab => then "UMKC Resources & Policy Statements Home" => then "UMKC Resources & Policy Statements (AY 2019-2020)". As a UMKC student, you are expected to review and abide by these policies. If you have any questions, please contact your instructor for clarification.

This course follows the "Faculty not allowing recording" option of the Academic Inquiry, Course Discussion and Privacy policy.

School of Biological and Chemical Sciences Course Policies & Resources

Please refer to the following web page and the linked resources for critical information regarding course policies and resources. You are expected to abide by all the rules and regulations regarding student conduct referenced in these pages. <https://sbc.umkc.edu/current-students/forms-resources.html>

Chemistry 322L Schedule of Labs

| Week | Lab | Due Date |
|-----------------------|--|---|
| January 20-24 | Check-in | |
| January 27-31 | 1. X ₂ Addition to Alkenes: Bromination of <i>trans</i> -stilbene | February 3-7 |
| February 3-7 | 2. Epoxidation of Cholesterol | February 10-14 |
| February 10-14 | 3. Diels-Alder Reaction: Hexaphenylbenzene, Dimethyl tetraphenyl phthalate, 1,2,3,4-Tetraphenylnaphthalene | 1. Extended write-up of all <u>4</u> experimental sections (including Triptycene is due March 2-6. 2. Diels-Alder (full) paper with corrected experimental section is due March 16-20. |
| February 17-21 | 4. Diels-Alder Reaction: Triptycene | |
| February 24-28 | 4. Diels-Alder Reaction: Triptycene | |
| March 2-6 | 5. Acylation of Ferrocene | March 9-13 |
| March 9-13 | 6. Alkylation of Biphenyl and <i>Para</i> -Dimethoxybenzene | March 16-20 |
| March 16-20 | 7. Nitration of Methyl Benzoate | March 30-April 3 |
| March 23-27 | No LABS! (Spring Break) | |
| March 30-April 3 | 8. Wittig Reaction | April 6-10 |
| April 6-10 | 9. Aldol Condensation | April 13-17 |
| April 13-17 | 10. Synthesis of Banana Oil | April 20-24 |
| April 20-24 | Check-out/Turn in Postlab 10 | |
| April 27-May 1 | Come to lab to pick up Postlab 10 | |
| May 1 (Friday) | CUMULATIVE LAB EXAM (LABS 1-10) (4:00pm-5:00pm in Royall Hall 111) | |

A copy of this statement will be provided for your signature before the first experiment

CHEM 322L Laboratory Safety Regulations: Initial the items and sign the bottom.

Semester Spring 2020 Section VO Room # BSB 385

TA Name _____ HOOD # _____

1. _____ I will prepare for lab by studying the experiment before class (including watching the prelab video that corresponds to each experiment) and by trying to anticipate potential hazards from the chemicals or procedures to be used.
2. _____ I will wear approved safety goggles AT ALL TIMES in the laboratory.
3. _____ I will not work in the lab unless an instructor or teaching assistant is present.
4. _____ I will not perform any unauthorized experiments.
5. _____ I will notify the instructor of health conditions (allergies, pregnancy, epilepsy, etc.) that may affect my ability to work in a chemistry lab.
6. _____ I will not eat, drink, chew gum, or smoke in the lab.
7. _____ I will not use cellular phones, radios, headphones, or other electronic devices in the lab.
8. _____ I will minimize my contact with chemicals by taking care to note odors, never tasting chemicals, using suction bulbs to fill pipettes, and washing any spilled chemicals off my person as soon as possible. I will wash my hands before leaving the lab.
9. _____ I will not wear shorts, sandals (or open-toed shoes), tank tops, or other clothing in the lab that allows unnecessary exposure to spilled chemicals. I am also aware that certain chemicals can ruin clothing and that wearing a lab coat or apron adds some degree of protection.
10. _____ I will secure long hair to keep it away from open flames and chemicals while I am working in the lab.
11. _____ I will immediately report all cuts, burns, personal injuries, fires, chemical spills, or other accidents to the instructor or teaching assistant.
12. _____ I will keep my work area and the common areas of the lab clean.
13. _____ I will NOT return unused chemicals to their original bottles.
14. _____ I will consult with the instructor or teaching assistant about the proper disposal of all waste chemicals.
15. _____ I know the location, operation, and appropriate uses of the eye-wash stations, safety showers, fire extinguishers, fire alarms, and fume hoods; and I know the locations of all lab exits.
16. _____ I agree to follow any specific or additional safety instructions that may be given for any experiments.
17. _____ I will conduct myself in a professional and respectful manner. I will leave the lab after I complete my work.

I understand all of these statements and agree to observe them at all times in the lab. I also understand that if I fail to observe them, I will be expelled from the laboratory.

CHEM 321L Academic Honesty Statement

I will perform the work by myself and will answer any postlab questions independently; I will only report data values that I have measured myself during lab; and I will adhere to the UMKC Academic Conduct Standards for Students (https://www.umsystem.edu/ums/rules/collected_rules/programs/ch200/200.010_standard_of_conduct). I have read and understand Chapter 200: Student Conduct from the UM System's Collected Rules and regulations. It is my responsibility to understand the facets of academic honesty and to uphold them. If I am not sure, I will consult with the instructor.

Sign: _____ Date: _____

Print Name: _____