

Chemistry 316L Course Syllabus Fall 2023

CHEM 316 and 316L are co-requisite courses, i.e., students in CHEM 316L are required to take CHEM 316 at the same time or to have already received credit in CHEM 316. Co-requisite course requirements are strictly enforced: Students who do not meet the co-requisite should drop the course or **they will receive an F in the course**. Students who drop or audit CHEM 316 will be required to drop CHEM 316L. To add lab sections during the first week of class, use AccessPlus. After the first week, please go to the Undergraduate Chemistry Office in 1608 Gilman.

Section	Time	TA	Office Hours	e mail
1	MW 12:05 – 2:55pm	Jemima Opare-Addo	MW 10 - 11 am	jalartey@iastate.edu
2	MW 3:20 – 6:10pm	Sarah Szakas	T 8 – 10 am	sszakas@iastate.edu
3	TR 12:10 – 3pm	Ethan Leung	R 8 – 10 am	eleung@iastate.edu
5	TR 9 – 11:50am	Sanduni Devasinghe	T 12 - 1 pm T 4 – 5 pm	sandunid@iastate.edu
316L Instructor	N/A	Dr. Jared Anderson	By Appointment 0210 Hach Hall	andersoj@iastate.edu
Lab Supervisor	N/A	Dr. Feili Qin	By Appointment 1279 Gilman Hall	flqin@iastate.edu

All TA office hours are held in either **1802 or 1831 Gilman**.

Required Experiment	Expert TA
Exp. 1 FTIR	Ethan Leung
Exp. 2 Spectrophotometric Titration	Jemima Opare-Addo
Exp. 3 Atomic Absorption	Sarah/Jemima
Exp. 4 Fluorometry	Ethan Leung
Exp. 5 Optical Microscopy	Sanduni Devasinghe
Exp. 6 Liquid chromatography	Ethan Leung
Exp. 7 Liquid chromatography II (TOF LC/MS)	Sarah Szakas
Exp. 8 Gas chromatography	Jemima Opare-Addo
Exp. 9 GC Mass Spectrometry	Sarah Szakas
Exp. 10 Cyclic Voltammetry of Ferricyanide	Sanduni Devasinghe
Exp. 11 Potentiometry	Sanduni Devasinghe

The "expert TA" is the TA who set up the experiment and is expected to maintain the experiment throughout the semester. The expert TA understands the experiment at a deep level and is responsible for grading the lab reports for that experiment. Students may wish to address their more substantial questions and questions regarding the style, form or substance for the lab report to the expert TA. All TA's are trained on all

experiments and can answer routine questions regarding procedure and the operation of any of the instruments.

Lab reports

Please follow grading rubric for each experiment when write your lab reports. Grading rubric for each lab will be posted on Canvas. All laboratory reports must be typewritten and submitted on Canvas. Please submit lab reports before midnight on due date. You must include copies of your notebook pages with your lab reports. Lab reports will be run through a plagiarism detection program.

Grading the Course

Grades will be assigned using the total lab score based on the normal curve. The total number of points possible for this semester is 1100 points. Students are encouraged to carefully read the first few pages of the lab manual (i-xii) for information on grading and laboratory policies. Lab Reports are due one weeks after lab completion. **After due date, reports are considered to be late and 10 points will be deducted per day, EVERY DAY, INCLUDING WEEKENDS.** (10 pts will be deducted for each day for all late days.) No lab reports will be accepted two weeks after completing the lab.

Safety

Safety is extremely important. You must observe all standard safety rules in the laboratory. Personal Protective Equipment (PPEs) such as safety eyewear, gloves, lab coat and fully covered shoes are important components for lab safety. Sandals are NOT allowed. You will not be allowed to do the experiment if you are not in proper attire. Safety goggles must be worn at all times. There is no eating or drinking in the laboratory. Any students who fail to follow these rules will be asked to leave the laboratory and will not be allowed to make up the missed lab. You are NOT allowed to wear these PPEs out in the hallway to avoid contaminations. Failing to follow these safety rules will also result in the loss of points.

Required for Laboratory

Safety glasses, Lab coat, and lab notebook.

Make-up Laboratory

Students are expected to attend all scheduled laboratory sessions and complete the experiments as scheduled. If a student has a valid reason for missing a lab period (e.g., illness, death in family), he/she should contact the lab instructor, and reschedule a time with the TA to complete the missed lab(s). Missed lab for other reasons will receive a zero score.

Come to the laboratory prepared. Read the lab manual and background material before showing up at lab.

Guidelines for 316 Lab Reports

Lab reports should be short but complete. Lab reports must include a **statement of purpose**, a brief **description of how the instrument works**, all **results**, presented clearly and completely, examples of all **calculations**, answers to all **questions**, **data**, and pages from your notebook. Plots of data should have descriptive titles and labels on both axes (including units). For several experiments, you will be expected to explore the effect of various instrumental parameters. For these experiments, you should include **summary and conclusions** of your exploration.

The **statement of purpose** should include specific measurements being made and the method being utilized (including apparatus and any specific methodology employed such as standard addition, internal standard, etc.). The purpose should be no more than 3 or 4 sentences.

The **description of the instrument** should be clear and brief. The operating principle of the instrument should be explained (in general terms). Including a hand drawn schematic of the major parts of the instrument is helpful. The text of this section should be around half of a typewritten page, certainly no longer than a page.

The **chemical safety information** should include any Safety Data Sheet (SDS) information about all the chemicals used in the experiment and any potential laboratory hazards. This section should also include all Personal Protective Equipment (PPE) to be worn.

The **statement of purpose, description of the instrument, and chemical safety information** are part of the **Pre-Lab** and must be completed before lab (**only typed Pre-Labs will receive credit**). Pre-Labs must be submitted on Canvas.

Pre-Lab reports are due at noon the day prior to your scheduled lab period. If you fail to complete the Pre-Lab report, you will not be allowed to perform the experiment on your scheduled day. You will lose 15 points and will have to reschedule the experiment.

Show one sample per type of **calculation** for the experimental analysis. Use the appropriate number of significant figures and show all units.

All derived (calculated) **results** should be summarized into organized tables. Plots of data are part of the results. Plots should be clearly and meaningfully titled, each axis should be labeled (including units). **All plots must be computer-generated using a spreadsheet or plotting program. Equations for straight lines and the correlation coefficient, R or R^2 , must be determined and reported.** Appropriately sized scales for axis should be selected. Data points should be clearly visible. When analysis of an unknown is required, report the experimentally determined value for your unknown sample. Also, report your unknown number.

All tables should be numbered and titled appropriately.

In the **conclusion**, students should clearly and briefly state the findings of the laboratory exercise, possible sources of error, and possible improvements to the method.

Answer all **questions** posed in the lab manual and by your teaching assistant.

All **data** should be turned in as part of your report. Copies of notebook pages will be turned in with your lab report. These pages will be graded according to the guidelines listed above.

Reports should have clear section headings: statement of purpose, description of how the instrument works, results, calculations, and questions. A portion of the grade is determined by how organized and clear the report is.

Reports are due **within** one week of completion of the lab experiment. **After one week, reports are late and 10% will be deducted per day, EVERY DAY, INCLUDING WEEKENDS.** (10 pts for 1 period lab experiments and 20 pts for 2 period lab experiments will be deducted for each day the report is late.) No credit will be given for reports turned in more than two weeks after the due date.

START LAB REPORTS EARLY. DO NOT PROCRASTINATE. Use your time effectively. If you start the report write ups early, you can seek out the teaching assistants or instructor for assistance well before the due date. The reports in this course generally require looking into references other than the lab manual - including the course text, the text from quantitative analysis, and others. Some of the data analysis is extensive and time consuming.

Lab reports are graded by the teaching assistant that set up the experiment. In this course, each experiment is set up by one or two teaching assistants. That teaching assistant is the "expert" on that particular apparatus. While all TA's are required to be experienced with all the experiments, the TA who set up the experiment should be contacted for more in depth problems and questions.

All lab reports need to be **typed** (Microsoft Word, 12-point font, Times New Roman) INCLUDING the prelab (which includes the Title, Experiment Number, Date, Statement of Purpose, Description of Instrument, Chemical Safety Information and Laboratory Hazards and Personal Protective Equipment (PPE) to be worn). Lab Reports must be FULLY typed (except for pages written during the lab) which includes all equations, sample calculations and chemical symbols using the equation editor function in Microsoft word.

Approximate point breakdowns for experiments can be found in the rubric, which is available for each experiment.

The **student's laboratory performance** is worth 10% of the total score and is evaluated by your teaching assistant. This score is based upon the student following safety procedures, cleaning up after themselves, arriving prepared, working thoughtfully and independently, carrying out all aspects of experiment to completion, and attitude. It is important that you make an effort to become both familiar and competent with the apparatus that you use. Exploration of the apparatus and showing initiative are encouraged.

You always need to keep backup copies of your lab reports on your own flash drive and computer. Do not save your file in any of the lab computers.

The instructor reserves the right to change the content of the syllabus anytime and will inform the students of any changes.