

# Chemistry 4010/6010 LABORATORY Syllabus

## Summer 2021 – ONLINE COURSE

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**LAB Instructor:** Dr. Jie Jiang, [jjiang2@gsu.edu](mailto:jjiang2@gsu.edu)

**LAB Coordinator:** Dr. Andrea Mezencevova, [amezencevova@gsu.edu](mailto:amezencevova@gsu.edu)

**Online LAB Sessions:** Monday and Wednesday 9am – noon.

**Note: Synchronous WebEx meetings (pre-lab lecture) will be hosted by Dr Jiang every Wednesday at 9am. The meeting link will be provided through email.** Monday will be asynchronous class and students should use all the provided materials, including the Powerpoints, the student notes and the related videos to study. This is also a good time to work on the assignments and reports.

**Communication with Students:** Email (please check your email regularly for updates) and the Chem 4010/6010 course page (find the “laboratory” Module for lab information) on iCollege <https://gastate.view.usg.edu/d2l/home/2327898>

**Lab Course Material:** Lab lectures, videos and other supporting material will be posted on iCollege. Raw data to be processed by students will be sent to students’ emails. Students are encouraged to use the course lectures and literature suggestions provided by Dr. Shamsi.

**Office hours:** Any questions or problems will be discussed with the instructor through email. The instructor checks email regularly, and you can expect to hear back from us within 24 hours.

**Midpoint:** July 2 (the last day to drop the class with a W)

**Please note that this syllabus reflects a plan for the semester. Deviations may become necessary as the semester progresses.**

### Course Description:

Chem 4010/6010 Lab is designed to teach the students various analytical separation methods used to separate mixtures into their pure components for identification and quantification. The techniques used include gas chromatography (GC), thin layer chromatography (TLC) and high-performance liquid chromatography (HPLC). These techniques are employed to separate unknown mixtures and to identify and/or quantify their components using external standards.

### Course Goals:

1. To learn the principles of GC, TLC and HPLC and the operation of a gas chromatograph and an HPLC station. To learn how different parts of gas or liquid chromatographic instruments work to allow complete qualitative and quantitative analysis of mixtures.

2. To learn effective strategies on how to measure and calculate the separation parameters for a mixture of chemical compounds, how to perform qualitative and quantitative analysis.
3. To learn to develop a chromatographic method(s) to achieve a separation and analysis of real-world sample representing a mixture of chemical compounds
4. To learn to write a proper formal laboratory report in an ACS style

### **Course Outcomes:**

1. Students will learn how to set experimental conditions and operate GC and HPLC instruments, how a proper injection technique should be performed, and how to collect the experimental data using chromatographic software.
2. Students will be able to process raw chromatographic data, to measure and calculate basic chromatographic parameters (e.g. retention time, peak area, retention volume, etc.) and use these parameters to identify unknown mixtures and calculate the concentration of their components. Students will learn how to read a chromatogram and be able to evaluate the quality of the mixture separation and suggest conditions that would improve this separation process.
3. Students will learn how to analyze “real-world” samples (e.g. analgesics), evaluate case studies and apply to the analysis of samples using the cumulative knowledge and learning achieved under goal 1 and goal 2.
4. Students will learn to compose laboratory reports in a format of scientific paper in standard ACS style.

### **Lab Sections Structure:**

- This laboratory course will be delivered online. The lab sections are scheduled to meet twice a week - on Monday and Wednesday.
- The Monday section will be asynchronous, meaning that students can involve into class activities (reading and watching lectures and videos, completing assignments, etc.) on their own time schedule.
- The **Wednesday section will be synchronous – we will have an online lab meeting through Webex starts at 9am.** The link to the meeting will be sent to your email every week.
- The **synchronous online meetings (every Wednesday) are mandatory.**
- Please note that deviations may become necessary as the semester progresses. Each change will be announced through email.

### **iCollege:**

This course uses iCollege for course material and assignments submissions. You are expected to have reliable access to a computer with an internet connection. Please note that iCollege has maintenance periods on many weekends. Please adjust your study schedule as needed.

## Lab Course Design

- This online lab course is divided into **7 Modules** representing 7 experiments selected to cover the basics of three chromatographic techniques – GC, TLC and HPLC. Each module will take one week (see the schedule)
- The modules will contain instructional material (pre-lab lecture and videos) along with the assignments for the individual experiments and will be posted on iCollege on weekends. **The assignments will need to be completed and submitted on the submission dates provided in the lab schedule.**
- Before the online meeting (on each Wednesday) students are required to read the prelab lecture and watch the videos to get familiar with the topic of the module.
- Experimental data to be processed and used for the assignments will be sent through email.

While you are working, the instructor will also be working hard to give you quality feedback and grade your assignments in a timely manner.

## Laboratory Assignments:

The following assignments will be required to be submitted throughout the semester:

- 4 formal laboratory reports
- 2 worksheets
- laboratory notebook.

The assignments will be posted on iCollege under the Assessments tab and will also be accessible from the corresponding modules.

### **Laboratory Reports:**

Lab reports will be written on the following experiments:

GC2 (Lab Report 1)—two submissions,

GC4-5 (Lab Report 2)—one submission,

TLC (Lab Report 3)—one submission,

HPLC (Lab Report 4)—one submission.

Criteria used in grading the lab reports are: (1) your understanding of the experiment as judged by your comments and answers to questions, (2) the quality of your data, (3) the completeness and accuracy of your data analysis (including error analysis), (4) the report's clarity, organization, and quality of presentation. Lab report format should follow ACS guidelines.

Lab reports are **100 points each** and must be turned in on the due dates (see the Lab Schedule). **5 points/ day penalty will be taken off for late submission (the reports, worksheet, or lab notebook, see page 4 “Late Assignments” for more details).** A detailed checklist for writing the lab report will be attached to the assignment folder. **Follow the instructions in the checklist.**

After grading, the Lab Report 1 will be returned to the students with the instructor's comments and suggestions. Students will be allowed to revise, re-write, and re-submit the said paper within one week. Lab Reports 2, 3 and 4 can be submitted only once.

### ***Worksheets:***

Worksheets will be completed on the following experiments: GC1 (Worksheet 1) and GC3 (Worksheet 3). They will be uploaded on iCollege in the appropriate assignment folder.

Worksheets are **50 points each** and must be turned in on the due dates (see the Lab Schedule).

Students are required to write each lab report/worksheet independently, analyzing the raw data provided by the instructor and discussing accordingly. **IT IS NOT PERMITTED TO USE OTHER PEOPLE'S DATA/DISCUSSION IN THE REPORT WITHOUT A REFERENCE.** If this happens, it will be considered as plagiarism, and zero score will be given on this paper. Grammar check (use Grammarly) is required for submission of all papers.

### ***Late Assignments:***

Late assignments will be penalized 5 points each workday delay (max 20 pts per week). After 2 weeks from the due date lab reports will not be accepted, and student will receive 0 points on that report.

### **Virtual Laboratory Notebook**

Students are required to maintain a lab notebook. For this online course, the Lab notebook will be an excel file provided by the instructor, in which a new sheet will be added for each new experiment. Each sheet's template should help you organize your data and results. The notebook will be uploaded on iCollege and will be also subject to grading (**50 points**).

### **Lab Course Grading:**

The maximum grade for this laboratory course is **550 points (100%)**:

- 400 pts for Lab Reports (4×100pts),
- 100 pts for Worksheets (2×50pts)
- 50 pts for Lab Notebook.

## Schedule of Laboratory Sessions:

Date**	Module (Experiment)	Assignment (Type)	Assignment Submission Date
June 9	GC1 - Injection Technique	Assignment 1 (Worksheet 1)	June 16
June 16	GC2 – Quantitative and Qualitative Analysis	Assignment 2 (Lab Report 1)	June 23 1 <sup>st</sup> subm. July 7 2 <sup>nd</sup> subm.
June 23	GC3 - HETP	Assignment 3 (Worksheet 2)	June 30
June 30	GC4 - Temperature Programming	Assignment 4 (Lab Report 2)	July 14
July 7	GC5 - Enthalpy Parameters		
July 14	TLC	Assignment 5 (Lab Report 3)	July 21
July 21	HPLC - Analgesics	Assignment 6 (Lab Report 4)	July 28

\*\* Date – day of the online lab session (each Wednesday)

### Grade Breakdown:

This is how (Chemistry) awards grades for courses:

Grade A+	95-100	Grade A	90-94	Grade A-	85-89
Grade B+	80-84	Grade B	75-79	Grade B-	70-74
Grade C+	65-69	Grade C	60-64	Grade C-	55-59
Grade D	50-54				

### Department of Chemistry Policy Statement Regarding Student Integrity:

The Department of Chemistry follows the university policy on academic honesty published in the “Faculty Affairs handbook” and the “On Campus: The Undergraduate Co-Curricular Affairs handbook.” Any suspected offenses may be referred to the Department Chair for appropriate action.

- All work must represent your individual, unaided efforts. To receive or offer information during an assignment is cheating. The use of unauthorized supplementary materials during tests is also cheating.
- All laboratory work performed during this course must reflect your individual effort. Only original data obtained by your own laboratory experimentation are permitted to be used, except when specifically authorized by your laboratory professor.
- Data from supplementary sources (handbooks, reference literature, etc.) must be clearly referenced (title, author, volume, page(s), etc.). Falsification or destruction of data constitutes cheating.
- Plagiarism and cheating in any form will not be tolerated and will result in failure for the associated assignment and possibly the entire course. Plagiarism includes the quoting or paraphrasing another source’s work without citation. If you are unclear on what constitutes plagiarism, please feel free to speak with me in more detail.

**GSU Policy Prohibiting Students from Posting Instructor-Generated Materials on External Sites**

The selling, sharing, publishing, presenting, or distributing of instructor-prepared course lecture notes, videos, audio recordings, or any other instructor-produced materials from any course for any commercial purpose is strictly prohibited unless explicit written permission is granted in advance by the course instructor. This includes posting any materials on websites such as Chegg, Course Hero, OneClass, Stuvia, StuDocu and other similar sites. Unauthorized sale or commercial distribution of such material is a violation of the instructor's intellectual property and the privacy rights of students attending the class and is prohibited. (This policy was approved by the GSU Faculty Senate on August 21, 2020)

**Note:** *This also includes your assignments (lab reports, worksheets, etc) that you have produced during the course, and which contain data collected using GSU's equipment and instrumentation during the lab sessions or provided by the instructor.*

**Special Needs:** Students who wish to request accommodation for a disability may do so by registering with the Office of Disability Services. Students may only be accommodated upon issuance by the Office of Disability Services of a signed Accommodation Plan and are responsible for providing a copy of that plan to instructors of all classes in which accommodations are sought.

Students with special needs should then make an appointment with me during the first week of class to discuss any accommodations that need to be made.

**FERPA:** In keeping with USG and university policy, this course website will make every effort to maintain the privacy and accuracy of your personal information. Specifically, unless otherwise noted, it will not actively share personal information gathered from the site with anyone except university employees whose responsibilities require access to said records. However, some information collected from the site may be subject to the Georgia Open Records Act. This means that while we do not actively share information, in some cases we may be compelled by law to release information gathered from the site. Also, the site will be managed in compliance with the Family Educational Rights and Privacy Act (FERPA), which prohibits the release of education records without student permission.

**Sexual Harassment:** In instances of sexual misconduct, the present instructor(s) and teaching assistants, are designated as Responsible Employees who are required to share with administrative officials all reports of sexual misconduct for university review. If you wish to disclose an incident of sexual misconduct confidentially, there are options on campus for you do so. For more information on this policy, please refer to the Sexual Misconduct Policy which is included in the Georgia State University Student Code of Conduct.

**Basic Needs Statement:** Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable us to provide resources that we may possess. The Embark program at GSU provides resources for students facing homelessness.