

DEPARTMENT OF CHEMISTRY

Intermediate Organic Chemistry Lab I (CHEM 2100, CRN 86012, 2 credits)

Fall 2018

Instructor: Dr. Joan Mutanyatta-Comar
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Office Hours: MW: 9:40 am – 1:00 pm.
Any other time by appointment.

Pre-lab Lecture: Thursday - 8:00 am - 8:50 am. (Room: PSC362)
Lab: Thursday - 9:00 am - 12:45 pm. (Lab PSC357)

Required Text: **GSU Chemistry 2100 Laboratory Manual.**

Optional Text: **Experimental Organic Chemistry**, By Wilcox and Wilcox.
Introduction to Spectroscopy, By Pavia, Lampman and Kriz.
4th edition.

Communication:

1. Please send emails to me from your GSU e-mail account, (e.g., jcole1@student.gsu.edu). Please put the course name in the subject of your email. **(Do not email me from iCollege)**
2. **Please check iCollege daily for class announcements and updates**

Learning outcomes: Students in this class will:

- Learn techniques such as solid-liquid and liquid-liquid extraction, recrystallization, simple distillation, fractional distillation, IR spectroscopy, mass spectroscopy and gas chromatography.
- Perform extraction and purification of compounds from natural products such as tea leaves and nutmeg.
- Synthesize an ester

Project Overview:

This course is divided into two major parts:

Part 1

- **Week 1-5** will cover techniques for isolation, separation and characterization of organic compounds. The fourth experiment will be synthesis of an ester.
- The worksheets (to be collected and graded) will be based on the four experiments: (1) extraction of trimyristin from nutmeg, (2) extraction of caffeine from tea leaves, (3) separation of benzoic acid and acetanilide and (4) esterification of acetic acid (synthesis).

Part 2

- **Week 6-14** will be on purification and identification of unknowns. This involves simple distillation of an unknown pure liquid (one component) and fractional distillation of an unknown binary mixture (two liquids).
- The final report will be on the neat liquid (from simple distillation) and the low boiler and high boiler (obtained by fractional distillation).

Grading Scheme:	Final Exam	100 pts
	Final Report	100 pts
	Exp. 1-4 worksheets	60 pts
	Homework, Notebook, Quizzes, preprn. Etc.	<u>140 pts</u>
	Total Pts	400

Tentative Letter Grades:

A+	=	96% and above
A	=	92%
A-	=	89%
B+	=	86%
B	=	82%
B-	=	78%
C+	=	76%
C	=	72%
C-	=	68%
D	=	64%
D-	=	60
F	=	< 60%

NOTES:

1. Attendance to lecture and lab will be recorded (sign-in/out of lab required). Absences can result in loss of points and lower grades.
2. Bound lab notebooks are required the first day of lab. All entries **MUST** be made in ink at the time the experiment is being carried out. **Notebooks must be submitted with the Final Report. Both the final report and notebooks will not be returned to students. You can come and see them in my office during office hours.**
3. Safety glasses/goggles: These may be purchased at the GSU bookstore, the Georgia Bookstore, and most hardware stores. They can also be purchased from the chemistry lab coordinator. Students who are unable or forget to bring their glasses may buy a pair from the Lab Coordinator by filling out a breakage form in the lab. Students who obtain glasses in this manner will pay for them at the time they check-out of the lab. Safety glasses/goggles must be worn at all times. Students will not be allowed into the lab without their glasses/goggles.
4. Students must bring safety glasses/goggles and closed toe shoes on the first day as experiments will begin immediately after check-in.
5. Failure to follow safety procedures will result in expulsion from that lab session with no make-up allowed and loss of credit.
6. The final report and final exam will not be returned. They will be available for review in the instructor's office.
7. Final Report and Final Exam grades will not be posted on iCollege.
8. Final grades are only available on PAWS/GoSolar. They will not be posted on iCollege. Please note that grades cannot be given to students by phone, or email.
9. No make-up for Final Exam

Impt. Dates:	Aug.	23 th	Lab begins
	Sept.	3 rd	Labor Day Holiday
	Oct.	9 th	Last day to withdraw with grade "W"
	Nov.	19-24 th	Thanksgiving Break
	Nov.	29 th	Last day of Lab.
	Nov.	29th	Final exam (8:00 am – 10:00 am), PSC362.

Class Preparation and Attendance:

Students are **expected** to attend all lab sessions. Please arrive on time as important pre-lab advisories will be given at the beginning of each session. Students are individually responsible for the timely completion of all assignments, absence being no excuse. Suggested reading assignments given during the course of a lecture should be completed before the next lecture and will constitute quiz material.

Chemistry Departments Student Integrity Policy:

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". All tests taken must represent the student's individual, unaided effort. Any suspected offense may be referred to the Department's Chairman for appropriate action.

All tests taken must represent your individual, unaided efforts. To receive or offer information during any examination 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.

The University requires that faculty members must, on a date after the mid-point of the course to be set by the Provost (or his designee)

1. Give a **WF** to all students who are on their rolls but are no longer taking the class
and
2. Report the last day the student attended or turned in an assignment.
Students who are withdrawn may petition the Departmental Chair for reinstatement into their classes.

Keys to success in the organic chemistry lab:

Students who do well in this course possess the following characteristics:

- **Attend pre-lab lecture and lab:** There is a very good correlation between class attendance (on time) and how well a student will do in this course.
- **Are prepared:** You will get the most out of class if you have reviewed the experimental procedures before coming to each pre-lab session.
- **Ask questions:** If you don't understand something, ask the instructor in class, during lab, after class, or during office hours.
- **Collect all returned graded quizzes.** They go over the questions they got wrong and ask the instructor for clarification. This way they don't make the same mistake again.

Tentative Laboratory Schedule

The pre-lab lecture/lab schedule listed in the GSU, Chemistry Department laboratory manual will be adhered to as far as is possible. This course is blended. This means that you will be required to watch some YouTube videos online (iCollege). Below is a detailed, tentative schedule.

Week #	Tentative Lecture Emphasis (lab work)	Reading Assignments (Read/Do before lecture)
Week 1 August 23	<ul style="list-style-type: none"> Safety video, safety exam, objectives of the course, check-in; begin Experiment 1: Extraction of trimyristin from nutmeg; recrystallization) 	<ul style="list-style-type: none"> Experiment 2 from the lab manual Watch YouTube Video on IR spectroscopy on iCollege Complete exp. 1 worksheet
Week 2 August 30	<ul style="list-style-type: none"> Submit exp. 1 worksheet (20 points) Notebook check 1 (5 points) Experiment 2: Extraction of Caffeine from tea leaves 	<ul style="list-style-type: none"> Experiment 3 from the lab manual Work on exp. 2 worksheet Watch YouTube Video 1 on IR spectroscopy on iCollege and write notes on your PowerPoint slides (class notes) Wilcox & Wilcox: pp 234-253; McMurry 9th Ed, pp 368-383)
Week 3 September 6	<ul style="list-style-type: none"> Sublimation of Crude Caffeine Experiment 3: Extraction of Benzoic Acid/Acetanilide 	<ul style="list-style-type: none"> Experiment 4 from the lab manual Complete exp. 2 worksheet Watch YouTube Video 2 on IR spectroscopy on iCollege and write notes on your PowerPoint slides (class notes) Wilcox & Wilcox: pp 234-253; McMurry 9th Ed, pp 368-383)
Week 4 September 13	<ul style="list-style-type: none"> Submit exp. 2 worksheet (20 points) Experiment 4: Esterification of acetic acid (synthesis) and purification 	<ul style="list-style-type: none"> Work on experiments 3 & 4 worksheets Practice Problems: IR Wilcox & Wilcox: Question 3: pp 253 McMurry 9th Ed Q12.7, 12.8, 12.9, 12.10, 12.31, 12.32, 12.34a, c,
Week 5 September 20	<ul style="list-style-type: none"> Submit experiments 3 & 4 worksheets (20 points each) Notebook check 2 (5 points) Make up lab 	
Week 6 September 27	<ul style="list-style-type: none"> Quiz 1 (Experiments 1-4; 25 points) Simple distillation of a neat liquid 	<ul style="list-style-type: none"> Review IR spectroscopy Distillation: Wilcox & Wilcox (pp 43-69) Chromatography: Wilcox & Wilcox (pp 122-147)
Week 7 October 4	<ul style="list-style-type: none"> Fractional distillation of a binary mixture Gas chromatography - theory 	<ul style="list-style-type: none"> Distillation: Wilcox & Wilcox (pp 43-69) Review IR spectroscopy

Week 8 October 11	<ul style="list-style-type: none"> IR spectroscopy theory Fractional distillation of a binary mixture (Continued) 	<ul style="list-style-type: none"> IR homework _Due next class Watch Youtube Video on Chemical Tests _Part 2
Week 9 October 18	<ul style="list-style-type: none"> IR Homework Due (25 points) 	<ul style="list-style-type: none"> Chemical tests: Wilcox & Wilcox, pp 164-178 Chemical tests practice problems: Wilcox & Wilcox, pp 206, question 5
Week 10 October 25	<ul style="list-style-type: none"> Fractional distillation of a binary mixture (cont.) Mass spectroscopy theory 	
Week 11 November 1	<ul style="list-style-type: none"> Quiz 2: IR + Distillation + Density (30 points) Chemical tests in the lab (continued) Fractional distillation of a binary mixture (Continued) 	<ul style="list-style-type: none"> Mass spectroscopy & practice problems: Wilcox & Wilcox, pp 208-231 (reading); 231-233. Questions 3 & 4 (practice problem)
Week 12 November 8	<ul style="list-style-type: none"> Chemical tests in the lab (continued) Fractional distillation of a binary mixture (Continued) 	
Week 13 November 15	<ul style="list-style-type: none"> Chemical tests homework due (20 points) Chemical tests in the lab (continued) Fractional distillation of a binary mixture (END) Format of Final Report; Format of Final Exam; (Clean –up, check-out) 	
Week 14 November 29	<ul style="list-style-type: none"> Final Exam Submit Final Report (100 pts) and Notebook (10 points) Clean –up, check-out 	

NOTE:

***Students with Disabilities:** 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 an accommodation is sought.

***A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent for the observance of a religious holy day shall be allowed to take an exam or complete an assignment scheduled for that day within a reasonable time after the absence.**

***Your constructive assessment of this course plays an indispensable role in shaping education at Georgia State. Upon completing the course, please take time to fill out the online course evaluation.**

***Deviations from this syllabus may be required.**