FALL 2018
SYLLABUS

CHEM 343 ORGANIC I LABORATORY:
TECHNIQUES AND INTRO TO SYNTHESIS & CHARACTERIZATION

Senior Instructor: Dr. Andrea Gorce
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Phone: 502-852-2733
E-mail: A0gorc01@louisville.edu
Office Hours: M 9:00-10:00 am , W 5:00-6:00 pm or by appt.

Sections:
343-01 T 8:00 am-11:50 am CB 214
343-02 W 1:00 pm-4:50 pm CB 214
343-03 T 8:00 am-11:50 am CB 216
343-04 Th 8:00 am-11:50 am CB 216
343-05 F 8:00 am-11:50 am CB 214
343-06 Th 1:00 pm-4:50 pm CB214
343-07 Th 8:00 am-11:50 am CB 214
343-08 M 1:00 pm-4:50 pm CB 214
343-09 F 8:00 am-11:50 am CB 216
343-10 T 12:30 pm-4:20 pm CB 214
343-75 W 7:00 pm-10:50 pm CB 214
343-76 M 7:00 pm-10:50 pm CB 214
343-77 M 7:00 pm-10:50 pm CB 216

Text: *The Organic Chem Lab Survival Manual*, any edition **Author:** James W. Zubrick
Lab Packets from Campus Printing Services

All other course materials will be posted on Blackboard.

Teaching assistants will provide you with their office hours and other necessary information in the first lab session. Please contact any one of them for help/questions about the experiments. TAs are responsible for the grading of all assignments, quizzes, and the final exam, therefore grading questions should be directed to your TA.

The tentative schedule of experiments is shown below. We may rearrange the ordering of the experiments if doing so better aligns the session with your lecture progress.

WEEK OF	**EXERCISE/EXPERIMENT**	**PRE-LAB READING**
8/20/18:		
All lab sections	Check-in/lab safety; equipment demo: micro and macro; course protocol and pre-lab lecture **ONLINE SAFETY QUIZ**	Read Zubrick chapters 1,2,4-9

8/27/18:

All lab sections	Purification & identification of unknown solids and liquids: 1. Recrystallization and melting point determination **QUIZ 1**	Read Zubrick on drying agents, on products, on melting points, on recrystallizations, on microscale boiling points

9/3/18:

Monday, 9/3/18	**LABOR DAY – NO LAB**

9/10/18:

Monday, 9/10/18	1. Purification & identification of unknown solids. 2. Microscale boiling point determination of unknown liquid. 3. Set-up for the synthesis of ethanol: fermentation step. **QUIZ 2**	Read Zubrick on microscale boiling points

9/17/18:

Monday, 9/17/18	Distillation of ethanol…a green chemistry experiment **QUIZ 3**	Read Zubrick on simple distillation, fractional distillation, heating mantles, theory of distillation

9/24/18:

Monday, 9/24/18	Extraction of acidic and neutral compounds; thin-layer chromatography **QUIZ 4**	Read Zubrick on extraction and washing; using a separatory funnel; thin-layer chromatography; IR spectroscopy

10/1/18:

Monday, 10/1/18	1. Extraction of chlorophyll and carotenes from spinach 2. Thin-layer and column chromatographic separation **QUIZ 5**	Read Zubrick on microscale extractions, thin-layer chromatography, wet-column chromatography

10/8/18:

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NO LABS – Fall Break!! :)

10/15/18:

Monday, 10/15/18	Isolation of Essential Oils via Steam Distillation **QUIZ 6**	Read Zubrick on steam distillation & IR spectroscopy

10/22/18:

Monday, 10/22/18	Williamson-ether synthesis: butyl ethyl ether 1. Synthesis and work-up **QUIZ 7**	Read Zubrick on refluxing, extraction, and short-path distillation; read on NMR

10/29/18:

Monday, 10/29/18	Williamson-ether synthesis: butyl ethyl ether 2. Purification and NMR **QUIZ 8**	Read Zubrick on refluxing, extraction, and short-path distillation; read on NMR

11/5/18:

Monday, 11/5/18	1. Acid-catalyzed dehydration of an alcohol: an E1 reaction; Collecting gaseous products. 2. Gas chromatographic analysis of the three butene products **QUIZ 9**	Read Zubrick on gas collection and gas chromatography

11/12/18:

Monday, 11/12/18	Acid-catalyzed hydration of norbornene: a stereoselective alkene addition **QUIZ 10**	Review Zubrick on separatory funnel extraction; read on sublimation

11/19/18:

Monday, 11/19/18	The stereochemistry of a Br_2 addition to *trans*-cinnamic acid **QUIZ 11**	Review Zubrick on refluxing

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11/26/17
ALL SECTIONS
REPORT TO LAB
AT REGULAR TIME

Lab Final Exam During Regular Lab Time/Check-Out

Other important information:

Safety is always the #1 priority. Lab **safety glasses** and **appropriate dress** are **mandatory**. No shorts, tank-tops, sandals, etc. You may keep sweat pants and tennis shoes in your lab tote in case you forget to dress appropriately for a lab day. Long hair must be tied back. Gloves are available and sometimes will be made mandatory. Please pay attention when the TA or Senior Instructor points out the safety features in the lab. Particular attention should be given to any safety tips for a given experiment. Precautions are noted at the end of each experimental write up.

Proper waste disposal is an integral part of practicing responsible chemistry and is **required** in the lab. Syringe needles must be disposed of in the sharps container. Waste solvents (from extractions, NMR samples, etc) are to be placed in the appropriate liquid waste containers; solid waste should be placed in the solid waste container. There are also broken glassware containers and glass pipette disposal containers in each lab. The handout often gives guidelines for proper disposal of consumables and chemical waste. When in doubt, please ask the TA or instructor for the proper disposal. Finally, if a mercury thermometer is broken, *immediately* notify your teaching assistant. There are special precautions that must be taken to clean up mercury spills.

Course Objectives: The primary objective of this laboratory course is to give you hands-on experience with the basic techniques employed by organic chemists. As you begin to master these techniques, you will be asked to apply them appropriately in synthesis experiments. In the latter part of the semester, you will also be introduced to some of the important characterization/product analysis techniques that will be emphasized in the second semester lab. The course goal is for you to make the connection between concepts and theories discussed in lecture and their application and execution in the laboratory. This means that there will be an emphasis not only the "how to" but also the "why and when to" inherent in organic experimentation.

With i2A in mind, this lab course will provide the opportunity to practice and develop **critical thinking skills**. In part, this will be (explicitly) modeled during class discussions and/or group problem-solving sessions. Key elements of critical thinking include: identifying the question or problem, analyzing evidence and developing arguments, integrating knowledge and demonstrating an awareness of multiple points of view, and drawing conclusions based upon reasons, arguments, and evidence. Your progress in this area will be assessed informally during prelab discussion, and formally in written lab reports.

Lab Preparation: Please COME PREPARED. All of the basic organic lab techniques and many other helpful hints for success in the lab are discussed in Zubrick's text. The syllabus lists the basic techniques you'll employ to carry out the experiment. Please **read the appropriate section** describing these techniques in the lab manual so you'll be prepared when you come to lab. **Pre-lab questions are to be turned in at the start of the experiment for a portion of that session's grade.**

Each week **before** the lab**,** the lab report template should be filled in with the title, objective, introduction, reaction/mechanism, and procedure sections already typed. You can then write in your observations and go home to word-process your results and conclusion sections. If you choose to keep a lab notebook and then go home and type up the entire report, that is also acceptable. In either case, **you must have the procedure written out before you enter lab.** Your TA will check for this procedure each week. ***If you come to lab without a written procedure, you will be asked to leave the lab until you complete the write-up of the procedure and you will lose the points for that week's procedure.***

GRADING

We use the 10 point scale (100-90 = A, 89-80 = B, etc). Grades will be computed based on a possible 1650 points. If you earn the following number of points, you are guaranteed the letter grade shown:

1485-1650	90% - 100%	A
1320-1484	80%-89%	B
1155-1319	70%-79%	C
990-1154	60%-69%	D
below 990 pts	below 60%	F

Lab Reports/Questions: One week after the completion of each experiment you will be required to turn in a type-written lab report. The template for this lab report can be found in the lab packet. Your TA will then grade the report and return it the following week. You will then place the graded lab reports in a 3-ring binder for the remainder of the semester. This binder will become your "lab notebook." You may also keep a traditional lab notebook if you desire, but these will not be collected or graded.

Be sure each report is complete. *Post-lab questions are given at the end of the experimental procedure and those questions should be answered directly at the end of the lab report; pre-lab questions are to be turned in at the start of the experiment for a portion of that session's grade.* The TA or Senior Instructor will discuss the format of the lab report with you in more detail during class. **Lab reports are due during your scheduled lab time one week following completion of the experiment unless your TA tells you otherwise. Late reports are docked 10% per day.**

Notice on the syllabus that there are 7 single session experiments, each worth 100 points, and 2 double session experiments, each worth 200 points, for a total of 1100 points. You will be allowed to drop one lab grade worth 100 points (or one-half of a double session grade). **Therefore, lab reports/lab questions constitute 1000 points (or ~61%) of your overall course grade.**

Quizzes: Your TA will give eleven 30-point quizzes during the course of the semester. Quizzes will be given *during each lab session* starting the week of 8/27/18. Your lowest quiz score will be dropped. **Therefore, quizzes will constitute 300 points (or ~18%) of your overall course grade.**

Final Lab Exam: A comprehensive final exam for the course will be given during the week of 11/26/18 during the regularly scheduled lab times. **The Final will constitute 350 points (or ~21%) of your overall course grade.**

The quality and thoroughness of your lab report will contribute strongly to your overall grade; *Please* don't fudge data in the hopes of getting a better grade! If you do have a low yield, a low mp, or

impurities in your product, can you offer reasonable explanations? That's much more important since it shows you are thinking about "what should" vs. "what might" have happened during the experiment.

There are no make-up labs. If you must miss a lab session ***for any reason***, ***consider that to be the lab grade that you will drop***. It is highly recommended that you do not skip any lab unless it is absolutely unavoidable.
What if I miss a lab? Students who miss *one* lab/quiz will be required to use that miss as their dropped lab/quiz grade for the semester (see exclusion below for UEAP absences).

If you must miss a *second* lab/quiz: What sorts of absences are excused?
First, be aware that it is **always** up to the instructor to decide whether an absence is excused or not. There is no cause that automatically excuses absence from class; all cases must be brought to the instructor. The burden of proof is on the student and hard copies of documentation will be required (email is usually not accepted). In any case, discuss with the instructor as far in advance as possible.
Generally excused:
• Absences due to medical emergency: provide a note from your doctor or the student health services stating that you were unable to attend lab. The note must be dated; we reserve the right to call your health care provider to confirm that the excuse is genuine. We don't want to know the nature of your medical emergency. We will not ask for, nor disclose, any personal medical information.
• Absences due to the death of an immediate family member: provide a copy of the obituary or other document stating the time and place of memorial services.
• Absences relating to University-sponsored travel (e.g. for athletes or members of other University organizations) require official documentation from the appropriate departments.
May be excused, at the discretion of the instructor:
• Court dates: provide a document from the court stating that you were required to be present at the time and date in question. We do not want to know the purpose of your court date.
• Emergencies, such as being involved in a car accident on the way to class: at a minimum, appropriate documentation showing that you were unable to be in class at the time in question (e.g., police or insurance report, tow truck receipt.) Injuries are covered above, under medical emergencies.
• Absences stemming from family emergencies or work-related conflicts: appropriate documentation will be required and excuses are not granted automatically.
Never or rarely excused: any absence that could be seen as avoidable, including but not limited to
• Absences due to inclement weather, if the University is operating.
• Oversleeping alarm, power outage, dead battery/car not starting, missed/late bus, ride not showing up, etc.
• Being stranded out of town, ride for break leaving early or returning late.
• Accident or illness at a time other than during the class or exam.
• Lack of child care (with rare exceptions that may constitute a family emergency–see above).
• Studying for another class, exam in another class, paper required in another class, etc.
• Social engagements, family reunions, family in town, picking people up at the airport, personal travel.
• Club sports, club events, fraternity or sorority events, etc. (exception for "University-sponsored travel").

How are *excused* absences generally handled?
• For students with an excused absence due to an accident, illness or emergency, or any other excused absence NOT due to a University-sponsored activity: if a student has exhausted his/her dropped grade for the course and must miss a ***second*** lab due to an excused absence, the missed lab/quiz is dropped from the semester grade calculation for that student: the value of that lab/quiz is not included in the total points for the semester when that student's semester grade is calculated. It is a good idea, if you have an excused absence on a lab/quiz, to remind your TA during the week before finals, just to make

sure your grade is calculated and recorded correctly. Excused absences on the lab final exam are rare and will be handled individually.

● **Students who miss a lab because of a University-sponsored activity, and who invoke the University Excused Absence Policy (UEAP):** students who invoke UEAP for a missed lab/quiz ***will not be required*** to use the missed lab/quiz as their dropped grade for the course. However, these students can ***choose*** to drop any or all UEAP-covered missed labs/quizzes from their grade calculation as above, or they can attend lab with another section. To attend a different lab section, the student must submit their intention, in writing, to Dr. Richter, ***no less than 7 days in advance of the scheduled lab***. This submission is necessary for scheduling purposes. The student must provide their weekly course schedule, with times and course numbers indicated. The lab may be scheduled by the professor to take place before or after the regularly scheduled lab. Unless all student obligations under this policy are met, a student will not be able to attend another section of lab.

How will an unexcused absence affect my grade? (Can I still pass?)

A ***second*** missed lab due to an unexcused absence will be recorded as a score of 0 and cannot be dropped from the student's course grade. BUT: Each weekly experiment and associated quiz counts as ~8% of the total grade for the semester. In principle, a student who missed two labs/quizzes, but earned high grades on the other work in the course could still earn a high A or a B without any accommodations at all.

NOTE: ANY STUDENT WHO MISSES 3 OR MORE LABS (EXCUSED OR UNEXCUSED) MUST CONTACT THE SENIOR INSTRUCTOR AND MAY HAVE TO TAKE AN INCOMPLETE FOR THE SEMESTER

What appeals processes are in place?

If you believe you are not being treated fairly under the terms of the syllabus and University policy, you should definitely meet with me and make your case. If, after doing so, you still believe I am not treating you fairly, you should make an appointment to speak with the Chair of the Department of Chemistry (I will be happy to help you set this up). You may request that I be present or not. The Department Chair can inform you of the other appeal options available to you under University policy.

TECHNOLOGY EXPECTATIONS

Because Blackboard is used extensively for communication in this course you will need to have access to a computer and reliable Internet service. If you do not have access at home, you can use the University computer lab in the library or one of the IT student computer labs on campus.

You must be able to use access and navigate Blackboard, use email, and know how to download documents.

For your privacy and security, only your official U of L email account will be used for communication. No information will be sent to personal email accounts. Please check your U of L email account daily.

STUDENT SUPPORT

Tech Support

Blackboard Student and After-Hours Support: HelpDesk Call Service: (502-852-7997)
Email Service: helpdesk@louisville.edu

The HelpDesk provides support to the entire University of Louisville community: faculty, staff and students. If you need assistance with accessing your university accounts, unlocking your password, accessing wireless or more, please let the support staff know.

Academic Support
Supplemental Instruction (SI) sessions are put on by the **REACH Program.** Tutoring by appointment may also be scheduled through REACH. Go to the REACH website, (www.reach.louisville.edu), click "Appointment Tutoring" to fill out a tutoring-request form or go in person to Strickler Hall, Room 107 and complete a request form.

DISABILITY SERVICES

Students with disabilities who require accommodations (academic adjustments and/or auxiliary aids or services) for this course must contact the Disability Resource Center (DRC). Please do not request accommodations directly from the professor. The DRC can be reached at (502)852-6938.

SEXUAL HARASSMENT

Sexual misconduct (sexual harassment, sexual assault, and sexual/dating/domestic violence) and sex discrimination are violations of University policies. Anyone experiencing sexual misconduct and/or sex discrimination has the right to obtain confidential support from the PEACC Program 852-2663, Counseling Center 852-6585 and Campus Health Services 852-6479. Reporting your incident to any other University employee (including, but not limited to, professors and instructors) is an official, non-confidential report to the University.

To file an official report, please contact the Dean of Student's Office 852-5787 and/or the University of Louisville Police Department 852-6111. For more information regarding your rights as a victim of sexual misconduct, visit the Office for Civil Rights (http//www2.ed.gov/about/offices/list/ocr/docs/know-rights-201404-title-ix.pdf) and for more information about resources and reporting at UofL, visit the Sexual Misconduct Resource Guide (http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure).

OTHER UNIVERSITY POLICIES

Please refer to the university policies on religious holy days/observances and diversity as detailed in the Student Handbook (https://louisville.edu/dos/students/studentpoliciesandprocedures/student-handbook).

MISCELLANEOUS INFO: This course has an underlying focus on microscale and Green Chemistry. Each of you will have your own personal microscale kits. Not only is our microscale effort an environmentally sound approach to bench chemistry (reduced reaction scale = less chemical usage = less chemical waste generated = less student exposure to toxic and explosive chemicals = safer lab conditions), I think you will also find that microscale experiments enjoy another benefit…shorter reaction times!

Problems? Both the TAs and Senior Instructor have office hours.

CHEM 343

Addendum to Syllabus

Please read the following clarifying requirements for labs:

Requirements

Before Lab

- Goggles and appropriate dress
- Prelab questions
- Procedure/Template of lab report: Title, Objective, Procedure and sketches of set-up

  No phones, laptops, or printed labs. Their Procedure should be sufficient to do the lab. May have "survival guide" book.

- Do quiz

During Lab

- Collect Data
- Clean up: Deduct points if student's bench isn't clean

After Lab

- Lab report is due 1 week later. Must be turned in at the beginning of class or be considered late (-10 pts)
- Type lab report (except for drawings)
- Keep concise, no "first person" writing.
- Attach handwritten, in ink, observations.
- Include Post lab questions

Sincerely,

Dr. Gorce