**REINHARDT UNIVERSITY**

**CHE 383 010 – Organic CHEMISTRY II LAB, spring ‘24**

**Professor:** Dr. Fred A. Fortunato **Lecture:** 10-10:50 am, M/W/F (Dobbs 101)

**Office:** Dobbs 126 **Study Sessions:** By appointment

**E-mail:**  [faf@reinhardt.edu](mailto:faf@reinhardt.edu) **Lab:** 12:30-3:15 pm, R (Dobbs 128/101)

**Phone:** 770-720-5594 **Office Hours:** As posted

**Overview:**

This syllabus is an extension of the CHE 382 Organic Chemistry II lecture syllabus, and provides specific information related to the laboratory portion of the course. Additional course information can be found in the full CHE 382 syllabus.

**Required Lab Materials:**

* Student Lab Notebook. Hayden-McNeil, LLC, 2010. ISBN: 978-1-930882-46-1. (or equivalent)
* A scientific calculator that does not store text information (for quizzes and exams). Some examples are: TI-30XIIS, TI-30Xa, CasioFx-300ESPLS2, Mr.Pen-scientific calculator. These can be purchased at Walmart, Target, or Amazon. If you are not sure whether your calculator is acceptable, please see the professor. Note, high-end graphing calculators like the TI-84 or equivalent are not acceptable, neither are mobile phones nor “smart” watches.
* Your operable Reinhardt University e-mail account. This must be working and checked frequently. Your account is not operable if your mailbox is full!
* Black or dark-blue pen.

**Recommended Supplementary Materials:**

* Lehman, John W. *Multi-scale Operational Organic Chemistry*. Second edition. Pearson Education, Inc., 2009. ISBN: 978-0-13-241375-6.

**Course Description:**

The chemistry laboratory is a corequisite to CHE 382, Organic Chemistry II lecture, and provides students the experience in conducting experiments that allows them to make scientific observations, measurements, and conclusions. Good laboratory techniques along with lab safety are stressed. *Corequisite: CHE 380.*

**Course Objectives:**

This course is designed to enhance the student’s understanding of the principles presented in the Organic Chemistry II lectures through practical application in the laboratory. Specific objectives include:

1. Develop safe laboratory habits
2. Use appropriate laboratory techniques to make observations supporting chemical laws and theories
3. Practice understanding chemistry experiments by reading the lab manual
4. Practice working with others to accomplish a common objective
5. Appreciate the difficulty of performing laboratory operations and obtaining reliable data

**Lab Instructors:**

The professor and perhaps a student a lab instructor will be conducting this course. Both should always be treated respectfully as your authority within this lab setting. Lab students who fail to follow the directions of the lab instructor will be given grade penalties.

**Lab Requirements and Procedures:**

* Read this syllabus and keep it handy for easy reference. **You’re expected to know what it says**.
* You must have your own student lab notebook, as delineated above. Grace will be extended up to one week after the first lab experiment. Following that, one (1) point will be deducted from every lab for which you don’t have a lab notebook.
* You do not need a copy of *Multi-Scale* *Operational Organic Chemistry,* which is a lab textbook, but it provides useful reference information for the lab experiments. This book was not specified to the bookstore. It can be purchased from other sources and sharing the cost of the book with other students is another option.
* There may be worksheets given out at times along with supplementary lectures during some lab sessions.
* Students should carefully and completely read the lab experiment before attending that lab period.
* You must bring to each lab: paper, pen, calculator, and pencil (optional). Mobile phone/watch calculators are **not** acceptable. If you have a laptop computer, that would be helpful for you to conduct your studies during some lab sessions.
* Safe lab practices are crucial. If your conduct is deemed unsuitable, you’ll be dismissed from lab with a zero for that day.
* Appropriate lab attire is mandatory. If you are not suitably attired, you will be dismissed from the lab to correct the issue(s). Lab work missed as a result will be graded accordingly.
* Lab books and write-ups should be completed in black or dark-blue **pen**.
* The use of mobile phones, PDAs, picture phones, Google glass, watch computers, or other imaging or gaming devices, or other e-mail or text messaging devices is not permitted in the lab, without the instructor’s approval.
* You are responsible for your lab area. Once your work is completed, you must clean up your lab station. Make sure burners are extinguished, wash and return lab supplies, and wipe off counters. Some substances may have special instructions for disposal, so pay attention. If you are unsure, ASK!
* You are responsible for your laboratory equipment. Make sure you take good care of the equipment. It is expensive and in limited supply.
* E-mail Communication Systems: e-mail is to be the principal means of communication between faculty, staff, administration, and students. Types of communication may include assignments, registration materials, announcements, etc. It is the responsibility of each student to check their Reinhardt University e-mail account regularly (daily is recommended), and the student will be held accountable for any and all official communication of administrative policies, faculty or lab instructor instructions, and campus information sent via the Reinhardt University e-mail system. Also check Canvas for class announcements.
* **All students are to follow the directions given by the lab instructor.**
* If class or school is cancelled, the lab activity for that day will be rescheduled and communicated either in lecture or via e-mail.
* Unless otherwise directed by the lab instructor, lab reports are due at the beginning of the next lab period.

**Attendance:**

Regular, punctual attendance is essential for doing well in chemistry lab. You are required to attend all scheduled lab sessions. If you are going to miss class due to university commitments, illness, or an emergency that arises, please notify the professor **prior** to the class. Excused absences, those approved by the professor, will qualify the student to make up the lab later. All non-excused absences will result in a zero (0) for that day. Other notes regarding attendance are as follows:

1. Arriving late (after the introductory discussion has started) may result in a loss of 1 point for that lab.
2. Leaving early without permission from the lab instructor may result in a loss of 1 point for that lab.
3. Being absent or late does not relieve the student of the responsibility of any due assignments.
4. All absences from class (including school-sponsored activities, ministry trips, etc.) are recorded and counted as absences. They may be excused, but still count as absences. Additional make-up labs may be scheduled as lab instructors’ schedules permit.
5. **The last day to withdraw with a “W” is March 12. If you withdraw from CHE 382, the lecture portion, you will also have to withdraw from the lab.**

**Health Considerations:**

Please follow safe practices regarding distancing and wear appropriate face covering, as delineated by the university or the professor, to protect the health of yourself and others.

**Service/Comfort Animals:**

For the safety of the service/comfort animal and the students, the animals are not permitted in the Chemistry laboratory (Dobbs 128) at any time. In the lab, the animals may inadvertently contact chemicals (such as from the floor due to spills) that could pose a harm to the animal. In addition, the presence of an animal in the lab also poses a safety risk to the other students in that the animal could create a tripping hazard or block access to various parts of the lab. Lab sessions held in a classroom setting (e.g., Dobbs 100) will be treated as lecture rooms from the standpoint of service/comfort animals (see the CHE 382 course syllabus for details).

**Lab Attire:**

Each student should wear to lab closed shoes that also cover the top of the foot, socks that cover the ankle, and pants which meet the top of the shoe. The following clothes should **NOT** be worn: sandals, flip-flops, flats, shorts, tanks, skirts, or Capri pants. Those students with long hair must have their hair completely pulled back so as not to get tangled with experiments or possibly burned. Secure shirts or sweaters with baggy sleeves which could get in the way of lab work. Contact lenses are **forbidden** while working in the lab. Approved safety eyewear will be provided.

**Lab Notebook:**

The lab notebook is a very important factor in determining your laboratory grade. As a professional scientist, you will need to develop the practice of keeping a good notebook. It should be a running record of what you have done in the laboratory. (Patent challenges have been won and lost based on the notes scientists kept in their notebooks.) Prior to starting an experiment, you should fully understand your objective of the experiment, why you are doing each step of the process, and the result(s) expected on the basis of chemistry principles. During the experiment, the experimenter should keep a running record of their actual actions, observations, measurements, unexpected phenomena, and any changes made to the proposed procedure. Once the experiment is completed, including data analysis, conclusions reached as a result of the work should be articulated. Further details related to the laboratory notebook are as follows:

1. Introductory Information: Give the title of the experiment and the date the experiment was started.
2. Objective and Procedures: A description of the objective of the experiment should be stated at the outset, along with the steps of the procedure. This section should be brief, containing the main details of the procedure such that another researcher should be able to reproduce this procedure from your lab manual.
3. Diagram(s) of (new) Equipment Setup: A labeled schematic drawing of the actual laboratory equipment set-up used in an experiment should be included. If the setup has been used in a previous experiment, indicate the page number in your notebook where the diagram first appears. If you are using a diagram from the laboratory manual, you could also reference the manual. Do not cut diagrams from a photocopy of your lab book and paste them in the notebook. We are looking for traceability of the set-up, especially if it is unique method of experimentation. Note any modifications to a set-up which is used for subsequent experiments.
4. Recording Data: An accurate, running account of the materials and observable results should be recorded as the experiment is being performed. Information regarding masses of reactants and yields of products should be noted. Changes in color, phases, temperature, melting points, boiling points, etc., should also be recorded. The date the experiment was concluded along with your initials should also be indicated at the end of this section.
5. Conclusion: The conclusion includes pertinent calculations (such as product yield for synthesis experiments). A description of the organic principles demonstrated by the experiment might be included, along with the characteristics of the organic family of the compounds used in the experiment (not just the specific compounds worked with). Any unexpected results (e.g. exceptionally good/poor yields) should be explained. Recommendations for further work are optional, but nice to have. Be sure to include the theoretical yield and the percent yield where appropriate.
6. Questions: There may be questions for thought following each experiment. Please complete the indicated questions as required.
7. Finalization: Close out the report by signing and dating at the bottom of each page.

Your notebook should be kept using a dark-blue or black **pen**.  If you make a mistake in entering information, cross out the error with a single line through the erroneous part and initial next to the line. Enter the correct information either after the crossed-out portion or directly above it. Parts 1 and 2 above are to be completed **prior to entering the lab**. Your work should be planned, and the procedures understood before starting work in the lab. This will help you be more productive during the actual lab time. Periodically the professor may check your preparedness. Parts 3 and 4 are to be entered into the notebook **while the experiment is in progress**. Do not write data on scratch paper and enter it later. It is appropriate to include times along with other measurements, if it is pertinent to the experiment. Parts 5, 6, and 7 should be completed **within one week of the actual lab experiment** unless otherwise noted by the lab instructors. Once completed, the original report pages should be removed from the book, stapled, and turned in for grading.

**Evaluation Procedures:**

This course is scheduled to meet thirteen (13) times during the semester. Students are required to attend all scheduled sessions, unless otherwise approved by the professor. All the lab experiments will be completed during class. Lab reports are worth 10 points and are due at the beginning of the next scheduled lab, unless otherwise indicated by the lab instructor. The total lab score for the semester is 105 points. The lab points, which constitute ≈ 25% of the total CHE 382 grade, will be added to your lecture scores to compute the final course average.

Points for each lab activity are delineated on the lab schedule. Additional notes regarding grading of the lab reports are as follows:

* Failure to complete parts 1 and 2, delineated under “Lab Notebook,” prior to beginning a lab experiment may result in a deduction of 1 point from the report total.
* Lab reports or assignments not turned in on time, without prior approval from the professor, will lose 2 points for the first day (24 hours) late, an additional 3 points each for the next two days (24-48 additional hours) late. If an assignment is more than 3 days (72 hours) past due, it will not be graded and a score of zero will be awarded for the assignment.
* Points may be deducted for failure to complete the experiment properly (obtaining no product, the incorrect product, very impure product, etc.). This usually results from improper lab practices, or not following directions carefully.

**Proposed Schedule:**

Below is a preliminary schedule for this course.

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| Date | **Lab Activity** |
| Jan 11 | Introduction  CHE 380 Review Quiz (15 quiz points) |
| 18 | Exp. #1: GC/MS Virtual Lab (15 pts)  [10 pts for lab report, 5 pts for worksheet] |
| 25 | Spectroscopy Worksheet #1 (10 pts) |
| **Feb 1** | **Quiz Ch 12-13, part 2 (open-book)** |
| 8 | Exp. #2: Virtual Spectroscopy Lab (10 pts) |
| 15 | Review Exam #1  Lab Discussion: Aromatics |
| 22 | Lab Discussion: Aromatic Reactions  Worksheet #2 (20 points) |
| 29 | Experiment #3: TLC Analysis (10 points) |
| **Mar 7** | **No lab – spring break** |
| 14 | Lab Discussion: Aldehydes, Ketones  Worksheet #3 (10 points) |
| 21 | Lab Discussion: Amines  Worksheet #4 (10 points) |
| 28 | Experiment #4: Extraction of Caffeine (10 points) |
| **Apr 4** | **No Lab – Spring Day** |
| 11 | Review Exam #2  Lab Discussion: Carboxylic Acids  Worksheet #5 (10 points) |
| 18 | Review |
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Revised: January 8, 2024

Note: This schedule may be further revised during the semester as needed. **Lab points total 105 for the semester.**