CHEM 272L Organic Chemistry I Lab
2 credits (CRN 62003)
MWF 1:00 PM-4:50 PM Imiloa 131

INSTRUCTOR: Bradley O. Ashburn, Ph.D.
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OFFICE HOURS: MWF 12:00 to 1:00 pm
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EFFECTIVE DATE: Summer 2011

WINDWARD COMMUNITY COLLEGE MISSION STATEMENT

Windward Community College is committed to excellence in the liberal arts and career development; we support and challenge individuals to develop skills, fulfill their potential, enrich their lives, and become contributing, culturally aware members of our community.

CATALOG DESCRIPTION

Laboratory principles of Organic Chemistry I, the first semester course in organic chemistry intended for science majors. Topics to be covered include structure, properties, nomenclature, reactions, reaction mechanisms, stereochemistry and spectroscopy of alkanes, alkenes, alkynes, alkyl halides, alcohols and their applications to biology. (5 hours laboratory)
Prerequisites: A grade of 'C' or better or registration in CHEM 272 or instructor's consent.
WCC: DY

STUDENT LEARNING OUTCOMES

1. Perform and develop skills in organic chemistry laboratory methods and techniques used in separation and purification.
2. Determine the chemical identity of some organic chemicals through their properties.
3. Keep complete and accurate records, manipulate data for mathematical calculations, including reactant recovery and percent yield.
4. Apply laboratory safety and safety disposal of waste procedure that can be used in all future laboratory experiences.
5. Gain experience in organic synthesis and functional group conversion.
6. Interpret experimental data and formulate conclusions as evidenced in laboratory reports.

LEARNING RESOURCES

Required Textbook: CHEM 272L Lab Manual (Available on Laulima under Resources)
Course Website: http://laulima.hawaii.edu (use UH email account login and password)
Other Requirements: Bound laboratory notebook, safety goggles, scientific calculator and internet access
PURPOSE OF THE LABORATORY COURSE

The chemistry laboratory allows the student to understand some of the theories discussed in the lecture more thoroughly. In the laboratory you will be involved with the processes of scientific inquiry used to discover chemical principles. It is the only way for the student to learn the techniques that are so important in research and in most laboratories. The student will discover that doing quality work in the laboratory requires a great deal of patience and care.

GRADING

1. Grades will be based on the following:
   - Pre-Labs (ten)------------------------ 100 points
   - Lab Notebooks (ten)---------------- 100 points
   - Formal Lab Reports (three)-------- 150 points
   - Lab Technique----------------------- 50 points
   - Final Exam -------------------------- 100 points
   - Total----------------------------------- 500 points

   Course grades will be assigned as follows:
   - A 450-500 points 90-100%
   - B 400-449 points 80-89%
   - C 350-399 points 70-79%
   - D 300-349 points 60-69%
   - F 299 points or below 59% or below

   The other grades I, W, Cr, NC to be assigned are described in the current college catalog.

2. **Pre-lab Assignments** - The purpose of the pre-labs are to think critically about the experiment you are about to perform including the techniques, chemical reagents, safety hazards, and reaction mechanisms involved. These are to be turned in **prior** to commencement of the pre-lab lecture.

3. **Lab Notebooks** - The laboratory notebook will be evaluated based on completeness, clarity and depth. They are due at the end of each lab period.

4. **Formal Lab Reports** - Three formal lab reports will be written according to the guidelines provided. Any of the seven synthesis experiments may be chosen.

5. **Lab Technique/Professionalism** - Students will be assessed based on the proper handling of chemicals, professional behavior, carry out of experimental procedures, adherence to safety rules, and preparedness for each lab session.

6. The **final exam** will cover all topics from the experiments performed in lab including but not limited to, chemistry involved, reaction mechanism, and explanation of organic laboratory techniques and principles (ie recrystallization, distillation, TLC, etc).
MODE OF INSTRUCTION

**Lecture/Laboratory:** Brief Pre-Lab lectures will be delivered by a variety of methods and include topics such as reaction mechanisms, safety concerns, proper equipment setup, and explanation of lab techniques and procedures.

COURSE POLICIES

1. The topics and exam schedule are found in the *Course Schedule* on the last page.

3. There will be **no make-up** for the final exam.

4. There will be **no make-up** for any lab experiment. A 50 point deduction in grade for each experiment that is missed will be imposed.

5. **Disruptive behavior** leads to loss of learning time. Examples are activated beepers and cell phones, making offensive remarks, eating or drinking in the classroom, packing of books, making noise, leaving class early, sleeping in class, prolonged chattering, reading other materials not relevant to this class, etc. If a student takes part in disruptive behavior, the instructor reserves the right to exclude immediately the student from that class meeting.

6. If you have any **special learning needs**, including hearing/visual impairment, please inform the instructor as soon as possible.

7. An "F" will be assigned to students involved in **cheating** systems.

8. Any class announcement pertaining to changes in schedule will be made at least a week prior to the affected date. However, **you are responsible** for knowing these changes, whether or not you were in class for the announcement. If you were late or missed class please borrow notes from your classmate.

LABORATORY INFORMATION AND SAFETY REGULATIONS

**Student Responsibilities - Before Lab Session**

- Come to lab prepared.
- Create a work plan ahead of time.
- Familiarize yourself with the experimental techniques to be utilized.
- Come to lab with any questions about the experiment.
- Complete each Pre-Lab Assignment and turn it in before lab session commences.

**Instructor Responsibilities - Pre-Lab Lecture**

- At the beginning of each lab period we will meet briefly to discuss of the experiment.
- Instructor will demonstrate techniques, apparatus setup, etc. for the experiment.
- Instructor will cover the chemistry of the experiment and note any safety hazards.
Student Responsibilities - General Information

• Attend each lab session - There are no make up labs.
• Treat other students with respect.
  • This is a professional collegiate setting. Act as though this is your workplace.
• Lab notebooks
  • All students are required to have a bound lab notebook
  • Each experiment must include Title, Date, Reaction, Reagent Table, Procedure, and Discussion/Conclusion sections.
  • Lab notebooks are due at the end of each lab period.
• Avoid unnecessary waste of natural gas, water, and other materials of any kind.
• It is recommended to wear clothing you don’t mind getting stained by possible spills.
• No unauthorized experiments allowed.
• The chemical stockroom is always off-limits.
• Do not move the balances or lean on balance table.
• Do not weigh chemicals directly on the balances.
• Immediately clean up any spilled chemicals.
• Ask for instructor permission before use of the centrifuge.
• Never put dispensed chemicals back into the reagent bottle.
• If you break a piece of glassware or equipment, please report it to Dr. Ashburn or the lab manager right away. There is no student charge for broken items however repeated incidents will results in reduction of lab technique grade.

Student Responsibilities - Safety Regulations

• The safety of yourself and others around you is the most important thing when in the chemistry laboratory.
• Safety goggles must be worn at all times in the lab.
• Wearing contact lenses is not recommended.
• If any chemical does get in your eye, immediately wash with flowing water from the eye wash for 15 minutes. Notify the instructor or lab manager immediately.
• Never hold a chemical directly near your face; even fumes can cause injury.
• Use the fume hoods when working with hazardous chemicals.
• Shoes must be worn - close toed, no sandals.
• Long hair should be tied back.
• Additional protective clothing such as a lab coat is optional, but encouraged.
• Never work in the lab alone; an instructor or lab manager must be present.
• Locate the exits.
• Locate the phone and emergency phone numbers.
• Note location of all the safety equipment (ie First Aid kits, safety shower, eye wash, etc).
• Locate the fire extinguisher - pull pin, point nozzle, grip and spray.
• Wash promptly and with lots of water when a chemical gets on your skin.
• Do not put additional chemicals on your skin to “neutralize” other chemicals.
• Avoid inhaling chemicals.
• Don’t eat or drink in the laboratory area.
• No smoking.
• Watch out for your neighbor - he/she might do something that is dangerous to you.
• Wash hands well before leaving the lab.
• No chemicals should be thrown away in the garbage.
• No iPod or cell phone use - reduction in professionalism grade for each incident.
• Pregnancy - it is not recommended that you work in the lab if you are pregnant.

**Student Responsibilities - Chemical Waste Handling**

• What goes down the drain
  • Organics - never
  • Aqueous solutions that are neutralized.
• Do not put sand down the drain
• Dispose of all waste in proper waste containers (non-halogenated, halogenated and solid)
• There will be clearly labeled containers for everything. If you aren’t sure, please ask Dr. Ashburn or the lab manager.
• Broken glass goes in the broken glass waste only.
• Wash glassware with acetone over acetone waste containers only.
• If a solution is acidic or basic it must be neutralized.
• Clean up your area thoroughly before you leave lab.

**DISABILITIES ACCOMMODATION**

If you have a physical, sensory, health, cognitive, or mental health disability that could limit your ability to fully participate in this class, you are encouraged to contact the Disability Specialist Counselor to discuss reasonable accommodations that will help you succeed in this class. Ann Lemke can be reached at 235-7448, lemke@hawaii.edu, or you may stop by Hale ‘Akoakoa 213 for more information.
## Course Content and Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Day</th>
<th>Experiment Title</th>
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<tbody>
<tr>
<td>1</td>
<td>Monday, 5/23</td>
<td>Lab Check In and Safety Lecture</td>
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<tr>
<td>1</td>
<td>Wednesday, 5/25</td>
<td><strong>Experiment 1:</strong> Synthesis of Acetylsalicylic Acid</td>
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<td>1</td>
<td>Friday, 5/27</td>
<td><strong>Experiment 2:</strong> Synthesis of Acetaminophen</td>
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<td>2</td>
<td>Monday, 5/30</td>
<td>Memorial Day Holiday</td>
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<td>2</td>
<td>Wednesday, 6/1</td>
<td>No Lab</td>
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<td>2</td>
<td>Friday, 6/3</td>
<td><strong>Experiment 3:</strong> TLC Analysis of Analgesic Drugs</td>
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<td>3</td>
<td>Monday, 6/6</td>
<td><strong>Experiment 4:</strong> Synthesis of Benzocaine</td>
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<td>3</td>
<td>Wednesday, 6/8</td>
<td><strong>Experiment 5:</strong> SN2 Reaction of 1-Butanol</td>
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<td>3</td>
<td>Friday, 6/10</td>
<td>King Kamehameha Day Holiday</td>
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<td>4</td>
<td>Monday, 6/13</td>
<td><strong>Experiment 6:</strong> E1 Reaction of 4-Methylcyclohexanol</td>
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<td>4</td>
<td>Wednesday, 6/15</td>
<td>No Lab</td>
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<td>4</td>
<td>Friday, 6/17</td>
<td><strong>Experiment 7:</strong> Synthesis of Banana Oil</td>
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<td>5</td>
<td>Monday, 6/20</td>
<td><strong>Experiment 8:</strong> Steam Distillation of Eugenol from Cloves</td>
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<td>5</td>
<td>Wednesday, 6/22</td>
<td><strong>Experiment 9:</strong> Extraction of Caffeine from Black Tea</td>
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<td>5</td>
<td>Friday, 6/24</td>
<td><strong>Experiment 10:</strong> Green Oxidation of an Aromatic Aldehyde</td>
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<td>6</td>
<td>Monday, 6/27</td>
<td>Lab Final Exam</td>
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<td>6</td>
<td>Wednesday, 6/29</td>
<td>Clean up and Lab Check Out</td>
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<tr>
<td>6</td>
<td>Friday, 7/1</td>
<td>No Lab</td>
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**Important Dates:**

- Formal Lab Report 1 due: Friday, 6/3
- Formal Lab Report 2 due: Friday, 6/17
- Formal Lab Report 3 due: Monday, 6/27
- Final Exam: Monday, 6/27