



## Chemistry 471 Independent Laboratory Research

The mission of Concord University is to provide quality, liberal arts based education, to foster scholarly and creative activities and to serve the regional community. (<http://www.concord.edu/academics/>)

### Course Information

Course: Chemistry 471: Independent Laboratory Research

Section: 01

Credit Hours: 3 credits

Room: Science Hall 408 and adjacent labs

CRN: 20804

Semester Taught: Spring 2019

Time: TBA (see below)

### Prerequisites

Consent of Instructor

### Instructor Information

Professor: Dr. Darrell W. Crick, Associate Professor of Chemistry

Email: [dcrick@concord.edu](mailto:dcrick@concord.edu) (best way to reach Dr. Crick)

Office: Science Hall 401A

Office Hours: M 1:00-2:50, TR 11:00-1:00, W 10:00-11:00 and by appointment

Phone: 304-384-5169 Fax: 304-384-6225

Website: <http://www.concord.edu/physci/>

Note that providing assistance to a student often requires going to the laboratory. If I am not at my desk during office hours, please check 407, 408, and other nearby fourth floor labs. Any changes to office hours will be posted on my door and announced in class or by email/posting to Moodle as appropriate.

I strongly encourage students to visit my office hours and email with any questions related to the course. I am here to help you be successful.

## Course Description/Rationale

This is a capstone course designed to integrate the student's previous course work and provide experience in applying learned concepts to advance knowledge in a specific area of science. Students will work on real research questions of relevance to biomedical or materials science.

## Required Text and Materials

- safety goggles (full seal)
- Scifinder account (available at no cost to the student through the Concord library)
- Student will keep an electronic laboratory notebook using either OneNote or (strongly preferred)  $\text{\LaTeX}$ .

## Recommended Text

- The ACS Style Guide: Effective Communication of Scientific Information, 3rd Edition. Anne M. Coghill and Lorrin R. Garson, Eds. ISBN-13: 978-0841239999  
Copies are available in the library and the instructor's office.

## Course Management System

This course will use Moodle.

Course resources will be available at [moodle.concord.edu](http://moodle.concord.edu). The instructor will add students to the appropriate Moodle section.

## Hardware/Software Needed

Access to a computer with a modern, standards-compliant browser (Safari and Chrome work best) and an internet connection will be required to access library and research group resources. Access to an office software suite will be required to complete assignments. Microsoft Office (Word/Excel/PowerPoint/OneNote) is provided by Concord. The freely available packages iWork (Pages/Numbers/Keynote), LibreOffice, OpenOffice, and NeoOffice will perform equally well. The student is strongly encouraged to learn basic  $\text{\LaTeX}$  and use it to keep an electronic notebook and prepare written assignments. Specialized software may be required in some instances and will be available on departmental computers for student use.

CHEM 471 does not use a course management system but a shared group folder is available that contains lab protocols, document templates, access to the sample database, and relevant

literature. The instructor will provide directions for accessing the shared group folder as well as a private folder for use by the student and instructor only.

An optional text messaging service is available and students are encouraged to join. Phone numbers are kept private using this system. The instructor will provide instructions for joining the list.

## Course Description

### Concord University Educational Goals

**Skills:** Proficiency in interpreting data, integrating information, formulating ideas, thinking critically, and communicating with others, as demonstrated by the following competencies.

2. An ability to employ appropriate observational, logical, analytical, computational, creative, and critical thinking skills within and across academic disciplines; and to apply these skills in problems solving.

4. An ability to analyze, synthesize, and integrate elements, information, and ideas.

5. An ability to evaluate elements, information, and ideas on the basis of appropriate criteria.

**Knowledge:** Familiarity with principles underlying academic discourse in various fields, as demonstrated by the following capabilities:

2. An Awareness of the fundamental characteristics and properties of the physical universe.

### Department Mission

The Department of Physical Sciences challenges students to become interdisciplinary, ethically responsible professionals and scientists. Our degree programs and courses engage students with fundamental scientific content with the aim to transform them into leaders in their discipline and equip them to succeed in future careers and post-graduate studies. Our faculty foster a dynamic learning environment that broadens students' knowledge, skills, and attitudes through active-learning curricula. Our mission drives the [Educational Goals and Objectives](#) of our programs.

### National Standards

Not applicable, but the course has been designed with input from the recommendations of the American Chemical Society Committee on Professional Training.

### Specific Learning Outcomes

As a result of taking CHEM 471, the student should:

- Be able to retrieve relevant information from modern databases and peer-reviewed literature

- Be able to formulate a basic research plan
- Be able to safely design and conduct experiments
- Be able to interpret results and design/adjust future experiments as appropriate
- Be able to safely and appropriately manage laboratory materials
- Be able to communicate results in a clear, concise format appropriate for submission to a peer-reviewed journal
- Be able to communicate results and relevance to a non-scientific audience

## Course Requirements

### Work Expectations

The student will meet with the instructor once per week at a mutually agreeable time to discuss previous results and adjust the experimental plan if needed. Appropriate documentation of the laboratory work as well as adherence to prudent laboratory practices will also be evaluated and discussed at the meetings. Lab time will be flexible and primarily determined by the student and the needs of the research. During a 15 week semester, it is expected that the student will spend 9 hours per week performing laboratory work. A goal is to perform the work between the hours of 9am and 6pm Monday through Friday but it is expected that some work will need to be performed outside of those times. Travel to Virginia Tech to access library resources and analytical services is anticipated. The schedule will be very flexible but must be discussed and agreed upon several days in advance.

### Grading Policy and Scale

Performance in the following areas will be used to determine the student's grade.

#### **Mentor Meetings - 10%**

Quality of preparation for and participation in weekly meetings with the instructor.

#### **Group Meetings - 10%**

Quality of preparation for and participation in group meetings. Group meetings may include all research students and faculty in the Department of Physical Sciences and may require students to present research results.

#### **Successful Milestone Completion - 40%**

- Literature Review and Research Plan

- Mid-term Project Review
- Final Project Report
- Public Presentation of Results

**Notebook Quality and Report/Presentation Progress - 10%****Lab Stewardship and Safety - 10%****Appropriate Lab Effort - 20%**

**Failure to check out of the laboratory at the end of the project will result in an "F" for the course. Check-out includes proper waste disposal and proper labeling and documentation for remaining samples**

Feedback on progress for each item will be provided during the weekly student-mentor meetings. The Final Project Report must be in a format suitable for submission to a peer-reviewed journal. Note that the Public Presentation requirement may be substituted with a presentation to the research group/instructor if the student is continuing research in subsequent semester(s).

Scale A: 90-100% B: 80-89% C: 70-79% D: 60-69% F: <60%

**Make-up Policy**

Regular attendance is essential for adequate performance and is required. Accommodations for documented university or medical excused absences will be made on a case-by-case basis. In situations where the student is aware of the absence in advance (athletic events, field trips, etc.), arrangements for completing required work either before or no later than seven (7) days after the absence must be made prior to the absence.

**Late Assignments**

Assignments that are not submitted at the specified times will be considered late. There will be a 10% deduction for each day late. Electronic assignments must be uploaded to the student's shared folder in a timely manner. "Technological difficulties" such as last minute computer failure or inability to access the internet are not acceptable excuses.

## Course Timeline

<b>Date</b>	<b>Item</b>
2/1	Rough Draft of <b>Literature Review and Research Plan</b> due by 10:00pm
2/8	Corrected copy of <b>Literature Review and Research Plan</b> due by 10:00pm
3/4	<b>Mid-Term Review</b> due by 10:00pm
4/18	<b>Poster Presentation at Undergraduate Research Day</b>
5/8	Final draft of <b>Project Report, Presentation, and Poster</b> due by 10:00pm
5/10	Corrected drafts of <b>Project Report, Presentation, and Poster</b> due by 10:00pm

## Policies and Information

### Safety

All appropriate safety guidelines will be adhered to strictly. Safety goggles must be worn at all times in the laboratory. In addition, the student must dress appropriately. Shoes that entirely cover your feet and clothing that entirely covers your torso and legs must be worn. Shoes with high heels, shorts, dresses/skirts, and long, flowing clothing will not be permitted in the lab. No exceptions will be permitted. Consult with the instructor if you have any questions. Students who do not follow safety instructions may have points deducted, be asked to leave without the possibility of make up or be dropped from the course.

### Electronic Device Policy

Electronic devices may be used in the lab but should not interfere with the safe and timely execution of experiments. Electronic devices must also be kept away from areas where hazardous chemicals are in use.

### Recording Policy

Audio and video recording of discussions and procedures is allowed but must not be shared outside of the Crick Research Group.

### Accessibility/Accommodations

Concord University is committed to responding to the needs of students with disabilities as defined by the Americans with Disabilities Act. Please inform your instructor at the beginning of the class semester if you have a disability and are requesting accommodations. It is your responsibility to self-disclose that you are requesting accommodations. The

University and the instructor will provide you with a reasonable accommodation. You should register with CU's Disability Services Office, located in the Athens campus Jean and Jerry Beasley Student Center, Bottom Floor, across from the Campus Post Office. The Disability Services Office phone is 304-384-6086 or you can email the Director, Nancy Ellison, at [nellison@concord.edu](mailto:nellison@concord.edu) for assistance.

### **Academic Dishonesty**

Refer to the [Concord University Catalog](#) for definitions and consequences of academic dishonesty.

**The instructor has a zero tolerance policy for academic dishonesty. Students guilty of academic dishonesty will receive an F for the course and dismissal from the University may be recommended.**

### **Concord University Honor Code**

A Concord University Honor Code was approved by students, staff, faculty, administration, and the CU Board of Governors. The Code states:

*"As a member of the Concord University Community I will act with honesty and integrity in accordance with our fundamental principles and I will respect myself and others while challenging them to do the same."*

The Honor Code is intended to unite the Concord community behind a culture of honesty, integrity, and civility.

**Your enrollment in this course signifies your agreement to abide by the CU Honor Code.**

### **Class/Online Attendance Policy**

Regular class attendance is part of a student's academic obligation at Concord. Irregular attendance may affect academic performance adversely and is detrimental to the atmosphere of a class. (See University Catalog Academic Policies and Procedures.) [Concord University Catalog](#).

## Emergency Alert System

In an effort to increase safety and security on our campus, Concord University encourages everyone to register for instant text message alerts. Alerts will only be used for security and safety notices. All students, faculty, and staff are eligible to receive text message alerts on their cell phones or email alerts. Please contact the IT Help Desk for further assistance (304-384-5291).

## Emergency Information

Emergency/courtesy telephones are located at the main entrance of each residence hall and at various other locations on campus. Emergency telephones can be identified by the flashing blue light and will provide the user with a direct link to Public Safety at the press of a button. To report an on-campus emergency, call 304-384-5357 or 911. The Office of Public Safety is located on the bottom floor of the Rahall Technology Center. For further emergency information go to the [Office of Public Safety](#)

## Inclement Weather Policy

As a general policy, the University will remain in normal operations during adverse weather conditions. In the event of severe weather conditions, the following may occur:

- University Closure  
No students or employees are to report.
- Classes Cancelled  
Students do NOT report BUT employees are expected to report to work at their normal time.
- Operating on an Inclement Weather Delay  
Under this schedule, all 8 a.m. classes will start at 10 a.m. Students and faculty will follow the Inclement Weather Schedule. (See [Athens/Beckley Inclement Weather Schedules](#).)

*\*Announcements invoking the late schedule or other options referenced above are aired on area radio and television stations and are sent as text and email messages to those enrolled for this service.*

## Student Conduct

In classrooms, online, laboratories, and during any activities that are part of course requirements, students are expected to observe reasonable rules of conduct. Failure to follow safety rules in the laboratory will lead to instructor dismissal from the course.

**Sexual Harassment & Assault**

Federal law, Title IX, and Concord University policy prohibits discrimination, harassment, and violence based on sex and gender (Including sexual harassment, sexual assault, domestic/dating violence, stalking, sexual exploitation, and retaliation). If you or someone you know has been harassed or assaulted, you can receive confidential counseling support through the Concord University Counseling Center (304-384- 5290). Alleged Violations can be reported non-confidentially to the Concord University Title IX Coordinator at 304-384-6327 or [titleix@concord.edu](mailto:titleix@concord.edu). Reports to Campus Security can be made at (304-384-5357). As an employee at Concord University, I am a mandatory reporter which means I must report any sexual misconduct I am made aware of. This includes verbal or written (such as in an assignment) disclosures of sexual harassment or sexual assault.

**Technology Services**

Contact the CU Help Desk at extension 5291 from campus or 304-384-5291 off campus. You may also e-mail [cuhelpdesk@concord.edu](mailto:cuhelpdesk@concord.edu).

**Syllabus Disclaimer**

"This syllabus is subject to change based on the needs of the class. Please check it regularly."