

malonateChemistry Research Seminar (Chem 475) – Fall 2019

Monday, 1:10 – 4:00 pm, Tomsich 207

Instructors: Prof. Kerry Rouhier (“Roo-yer”) and Prof. Matt Rouhier will be co-teaching this course

Office: KR: Tomsich 212, MR: Tomsich 208

email: KR: rouhierk@kenyon.edu, MR: rouhierm@kenyon.edu

Office hours: KR: due to partial parental leave, all office hours will be by appointment or via email; MR: M (4-5 pm), T (1-2 pm), W (3-4 pm), or by appointment

class website: Moodle

Course Description

This is a required course for all chemistry majors and strongly recommended for all biochemistry majors including those involved in independent research. The course covers topics relating to chemistry research. Weekly meetings will involve (1) searching chemistry literature, (2) analyzing primary research articles, and (3) discussing ethics, trends, funding and other issues relating to chemistry research. During the semester, students will give written and oral presentations of primary research articles. Prerequisite: senior standing. Offered every fall semester.

Course Objectives

Kenyon is institutionally committed to promoting a liberal arts education and as such has outlined the learning goals for your college-wide education that promotes and develops skills that are useful to any career but also essential for a fulfilling and valuable life. In addition, the community of students and faculty in the Chemistry Department are dedicated to achieving skills interlaced with the chemical world. The learning goals of this course are grounded on those suggested by both the college and the department. Specific mapping of the Department and College learning goals to those of this course are described below. If you would like to learn more about Kenyon’s learning objectives or the Chemistry Department’s learning objectives, visit: <https://www.kenyon.edu/directories/offices-services/registrar/course-catalog-2/administrative-matters/kenyon-college-its-mission-and-goals/> or <https://www.kenyon.edu/directories/offices-services/office-of-the-provost/faculty-resources-information/department-mission-statements-and-assessment-plans/chemistry/>

COLLEGE AND DEPARTMENT LEARNING GOALS

Department learning goal	Course connection
Write well – “Each student should learn to write well by being required to answer essay exam questions, write term papers, problem set answer sheets, laboratory and research reports, all critically evaluated by faculty.”	Students will be writing a scientific review paper that will be both evaluated by the instructor and peer evaluators.
Effective oral communication – “Each student should learn effective oral communication skills by being encouraged to ask questions in all classes and converse frequently with faculty, and required to make extended oral presentations	Students will give two short oral presentations related to their research topic during the semester. This is also a discussion-based course where students

in more advanced classes as well as in the departmental Senior Exercise.”	are encouraged to actively participate each week.
Assess, evaluate and use information – “Each student should learn to access, evaluate and use information from computerized information sources.”	In order to successfully write the scientific review paper, students must assess, evaluate and use information from multiple sources (primary literature, reviews, etc.) to form a cohesive and distinct document.
College learning goals	Course Connection
Gather and evaluate diverse information – “Gather information from a variety of sources and evaluate its quality”	In order to successfully write the scientific review paper, students must assess, evaluate and use information from multiple sources (primary literature, reviews, etc.) to form a cohesive and distinct document.
Formulate and communicate ideas – “Formulate ideas rigorously and communicate them effectively, orally and in writing”	Students will write a scientific review paper and give two presentations on their topic during the semester.
Ethical and informed judgments – “Address ethical questions and make informed qualitative judgments”	Students will engage in a discussion on ethical conduct in scientific research in several classes.
Work creatively	The review paper will be a distinct contribution to the scientific community.

Specifically, to complement standard coursework in chemistry, the American Chemical Society (ACS) and the American Society for Biochemistry and Molecular Biology (ASBMB) recommends that instruction in (1) chemical literature and information retrieval, (2) developing effective **written and oral communications skills**, and (3) **professional ethics** be part of every undergraduate chemistry and biochemistry curriculum.

A report by the Carnegie Commission (“*Reinventing Undergraduate Education*”) includes ten recommendations for improving undergraduate education, one of which was that every major course of study should culminate with a **capstone course**. “Senior seminars or other capstone courses... need to be part of every undergraduate program. . . [They] should prepare undergraduates for the expectations and standards of graduate work and the professional workplace” the study asserts.

Finally, the Chemistry Department encourages students to be involved in and aware of **research in the chemical sciences**, and to apply the knowledge gained in courses to research questions. Our departmental **Senior Capstone** involves a presentation of research results from literature articles. To adequately prepare oral and written presentations on a research topic, students should be able to (1) search the primary chemistry and biochemistry literature effectively using online databases, (2) find appropriate resources in the primary, secondary, and tertiary literature to assist in learning about a topic, (3) carefully read, analyze, and critique research papers, and (4) organize and present effectively this newly-acquired knowledge.

To prepare students to meet these goals, the Chemistry Research Seminar has been established. In this course, students will: (1) explore a research topic by searching chemistry literature sources, evaluating

primary research articles and organizing and writing a review paper; and (2) discuss the nature of research in terms of conduct, publication and professional development.

Materials and Resources

- Required: Folder or Three-ring binder – for handouts
- Required: Laptop or tablet – for in-class work (equipment can be borrowed from the library)
- Required: access to Moodle page – for electronic resources and submission of materials
- Recommended: Joshua Schimel *Writing Science*, 2012; Randy Olson *Houston, We Have a Narrative: Why Science Needs Story*, 2015

Grading

The grade for this course will be based on:

A. Active participation in the course	30%
B. Oral presentations	10%
C. Peer editing	10%
D. Progress made between drafts of your paper	10%
E. Final research paper	40%

A. PARTICIPATION

This is a discussion-based course and therefore requires active participation. There are many ways students can demonstrate their active participation and will do so through the thoughtful completion of *participation logs* and *progress reports*. Participation logs are completed bi-weekly via a link through Moodle where students are asked to reflect on the variety of ways they participated in that class session. Progress reports will be completed during the first half of the semester and are intended to help the student during the early stages of the writing process. The content of the progress report will be based on the weekly topic covered either in a previous class session or in an upcoming class session. The instructor will provide periodic feedback regarding the extent of student participation.

B. ORAL PRESENTATIONS

Students will give two oral presentations during the semester. The purpose of these presentations is to gain experience in giving a scientific talk and to share information with classmates about your selected research topic. Students will be provided feedback from peers and the instructor, which will ultimately help inform the writing of the research paper. Grades will be assessed based on the extent of completion of the oral presentation.

C. PEER EDITING

Students will learn to edit peer research papers through a guided editing process. Through this process students gain feedback on their own writing and broaden their exposure to other areas of chemistry. Grades will be assessed based on completion of the peer editing process.

D. PROGRESS BETWEEN DRAFTS

A major portion of this course is the successful submission and completion of the final research paper. Throughout the semester students will be responsible for submitting portions or drafts of their research paper (due dates are noted in the course schedule). Progress made between drafts will be evaluated based on changes made to the document since the last draft, which could include the addition/removal of text where appropriate or editing made to existing text that improves the document. Grades will be assessed based on the extent of progress made between drafts.

E. FINAL RESEARCH PAPER

The main project in CHEM 475 is exploring an individual research topic and writing an original and well-defined literature review. The format of this document should follow that of standard reviews (such as those in Account of Chemical Research), including Abstract, Introduction, body (with labeled sections and subsections), Conclusion, and References. The body should contain information gathered from 10-15 recent primary research articles (as well as other respected sources), include effective graphics, and be organized such that it gives a modern overview of the chosen topic. It is expected that the student will insert their own comments and perspectives into the paper using review convention. This paper will be 4000-6000 words in length and evaluated using a rubric. *Your CHEM 475 research paper can be submitted to the Department as your Senior Capstone paper.*

Course Expectations

A. ATTENDANCE

Students are expected to attend every class. A student's attendance record will be considered as part of the participation grade for this course. If your participation in co-curricular activities conflicts with a class or assignment due date, please let me know as soon as possible, but at least two weeks in advance if possible. Typically, you will be expected to complete your work before (not after) the deadline, so please plan accordingly.

B. CLASSROOM CONDUCT

Students should plan to bring a laptop or tablet to class each day but must refrain from using the devices to do anything other than work directly related to this class. Cell phones should be silenced... If a student needs to leave the room during class (e.g. to use the restroom), please do so quietly to minimize disrupting the class. There will be at least one break during each class.

C. LATE WORK

Occasional late submissions will be accepted without penalty; however habitual offenders will start receiving a penalty of 15% per 24 hours late (including weekends). Students with frequently late submissions will be notified of the enforcement of the penalty after 3 late submissions.

D. OUT-OF-CLASS WORK

While there will be some class sessions dedicated to writing or preparing for oral presentations, students are expected to be spending time outside of class working on their research paper, the main project for this course. Other assignments to be completed outside of class directly align with course objectives.

Department Colloquia and Campus Events

Members of this class are expected to attend the Chemistry Department colloquia throughout the semester. Please inform the instructor if you have a conflict with another class or curricular commitment. This year also marks the 50th anniversary of co-education at Kenyon and as such, there will be numerous events being held on campus to celebrate. We hope you will be able to attend many of these events to share in the celebration.

College Policies

A. ACADEMIC HONESTY:

Kenyon College is, at the core, an intellectual community of scholars – students and faculty – engaged in the free and open exchange of ideas. Critical to this lively exchange and deep engagement with ideas is the academic integrity of our work, both inside and outside the classroom. At Kenyon we expect all students, at all times, to submit work that represents these standards of academic integrity. It is the responsibility of each student to learn and practice the proper ways of documenting and acknowledging those ideas and words you have drawn upon (*see Academic Honesty and Questions of Plagiarism in the Course Catalog*). Ignorance and carelessness are not excuses for academic dishonesty. If you are uncertain about the expectations for academic honesty in this class, please ask for clarification before submitting work for a grade. A violation of academic honesty is among the most serious matters in the academic division of the College.

B. ACCESSIBILITIES ACCOMMODATIONS:

A student with a disability who thinks they may need an accommodation to access a campus program, activity, or service should contact Erin Salva in Student Accessibility and Support Services (SASS) at salvae@kenyon.edu to discuss specific needs. Advance notice is required to review documentation, evaluate accommodation requests and provide notice or arrangements for any accommodation.

C. RESPONSIBILITY AND TITLE IX

As a member of the Kenyon College Faculty, I am concerned about the well-being and development of our students and am available to discuss any concerns. However, I want you to know that faculty members are legally obligated to share certain information with the College's Title IX coordinator. This is to ensure the student's safety and welfare is being addressed, consistent with the requirements of the law. These disclosures include, but are not limited to, reports of sexual assault, relational/domestic violence, and stalking.

Fall 2019 SCHEDULE

week	date	topic	Due at start of class unless noted
1	Sept. 2	Organizational meeting: What is chemical information literacy?	Self-assessment questionnaire due prior to first class
2	Sept. 9	Introduction to chemistry literature Searching for primary sources	Progress Report #1
3	Sept. 16	Reading primary literature Peer review process	Progress Report #2 Participation log #1
4	Sept. 23	Organizing references Annotated bibliographies	Progress Report #3
5	Sept. 30	Oral presentation skills	Progress Report #4 Participation log #2
6	Oct. 7	Oral presentations #1	5-7 minute talk
7	Oct. 14	Writing workshop 1: Organizing a literature review and writing introductions	Progress Report #5
8	Oct. 21	Writing workshop 2: Improving writing style	Progress Report #6 Participation log #3
9	Oct. 28	Discussion of conduct in scientific research	
10	Nov. 4	Revising other's drafts References and citations	Paper draft #1 Peer review draft #1 – Nov 6 th
11	Nov. 11	Writing workshop 3: Revising your own work	Participation log #4 Paper draft #2 Peer review draft #2 – Nov 15 th
12	Nov. 18	Preparation for life after Kenyon Effective use of graphics	
	Nov. 25	<i>no class – Thanksgiving</i>	
13	Dec. 2	Oral presentations #2	5-7 minute talk Paper draft #3 – Dec 3 rd Peer review draft #3 – Dec 6 th
14	Dec. 9	Individual consults with instructor or mentor	Participation log #5
exam week	Dec. 20		<i>final paper is due by 8:30 AM</i>