

SYLLABUS

CHEM6050C, Fall 2023

The instructor reserves the right to change/update any part of this syllabus, with notice.

Course Description

CHEM6050C is a survey of the current literature in analytical and physical chemistry. The general objective is for students to present up-to-date literature that is, at most, only tangentially related to their fields, and to learn how to supply appropriate background to the audience, present the pertinent results, and make critical assessments on the validity of the results, the nature of the experiments, and/or on the relevance to the broader chemical literature.

Course Philosophy

This course seeks to develop a close-knit intellectual community between the analytical and physical chemistry divisions. This community is intended to be fostered by respectful dialog and scientific discourse. Each of us approaches science with a different perspective informed by our personal upbringing, educational background, socioeconomic status, racial identity, ethnicity, and gender. My goal is to create a classroom environment that supports students from a diverse set of backgrounds. I strongly believe that our best path forward to making scientific progress is to promote inclusiveness and equality. It is my expectation that every member of this class will also support diversity and inclusion. As a community, we should strive to uphold the ideals of Our Common Ground and welcome any suggestions as to how I can promote a more diverse and inclusive classroom.

Modality Description

This course will be held in-person unless otherwise specified. Students attending lecture must obey the on-campus mask mandate and other UVM policies as stipulated by the university's Green and Gold Promise. I will give students instructions on how to proceed in the event that the course switches to a remote or mixed format due to COVID-19 concerns.

Learning Outcomes

To foster good habits and practices of staying current on the latest trends and topics of analytical and/or physical chemistry through scholarly studies of the recent literature. To help develop your critical thinking skills and the ability to think deeply about the literature.

To improve scientific communication skills with emphasis placed on presentation, discussion, Q&A, and the precise diction of analytical and/or physical chemistry.

To develop your skills in critically analyzing literature and presenting your findings to the broader audience.

All of these skills are particularly useful in grant writing, manuscript preparation, manuscript reviews, and grant reviews.

Instructor

Yangguang Ou

Office

E341 Innovation Hall

Instructor email

you@uvm.edu

Office hours

By appointment only.

Credit

CHEM6050C is worth 1 credit hour.

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Meeting times

Specific Fridays, 9:40-10:30 am, Location Lafayette Hall L311

Late arrivals should be rare and quiet. Enter the room with your phone off or silent at all times.

Blackboard

Blackboard will be used for course announcements, syllabus, and other course-related documents.

Technical Support

Students, please read this technology checklist to make sure you are ready for classes: <https://www.uvm.edu/it/kb/student-technology-resources/>

Students should contact Helpline (802-656-2604) for support with technical issues.

Key Benchmarks & Timelines

Pick a paper to be approved by advisor and instructor 3 weeks before the presentation
Make a full set of slides (sent to advisor and instructor) 1-1.5 weeks before presentation
Send pdf out to the attendees 2 days before presentation

Selection of papers

You may choose any paper in analytical and/or physical chemistry journals that has been published in the last 12 months. A pdf copy of the discussed paper must be distributed to all members of the analytical and physical divisions at least two days before the scheduled presentation. The paper that you select must be approved by both myself and your advisor at least three weeks prior to your presentation. You may select method development papers only if they are exceptional in quality and the science is novel (as in not using an established approach for a new application). It is highly recommended that you choose a paper with a clear scientific problem/hypothesis from high impact, high quality journals such as the ones listed below. It does you no good to select a bad paper because we want you to not only focus on superficial critiques but also delve deeper into the assessment of the science and methodology. It will be easy for you to focus primarily on the superficial issues of a bad paper (because there are so many) and as such you will not have time to address in-depth critiques and/or you will miss them and that could cost you a satisfactory score.

- *Science*
- *Nature*
- *Nature Chemistry*
- *Nature Nanotechnology*
- *Nature Communications*
- *Nature Photonics*
- *JACS*
- *PNAS*
- *Nano Letters*
- *ACS Nano*
- *ACS Photonics*
- *Chemical Science*
- *Angewandte Chemie*

Students can also select papers from more specialized journals, but they should ensure along with their advisor that the paper is of sufficient quality and broad appeal to be appropriate for the audience attending seminars. Potential specialized journals are listed below.

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- *ACS Chemical Neuroscience*
- *ACS Sensors*
- *Analytical Chemistry*
- *Analyst*
- *Journal of Physical Chemistry A/B/C/Letters*
- *Journal of Chemical Physics*
- *ChemComm*,
- *PCCP*
- *Sensors and Actuators A/B*
- *ACS Measurement Science Au*

Presentation

Presentations should be brief and informative (ca. 15-25 slides or 25 minutes, at least 10 - 20 minutes for questions). You must include the complete citation, authors' names, and article title. You should supply appropriate background to the audience (including the primary methods), present the pertinent results, and make any critical comments on the validity of the results, the nature of the experiments, and/or on the innovation and significance in the broader chemical literature. Presentations must be completed 1-1.5 weeks prior to the seminar talk and the slides must be sent to me and your advisor for review and feedback. Please note that students will still be permitted to change their presentation prior to their seminar talk but a complete set of slides is still expected at the approval stage so we can give proper feedback. Finally, it is highly encouraged that you practice your presentation with your colleagues and/or advisor prior to giving your seminar talk.

Discussion

As presenter, your job is to moderate and guide the discussion, including clarifying any confusion or misdirection based on your literature readings. One way to open discussion is to pose one or two open-ended, but specific questions to the audience. Student attendees are expected to be active participants in the discussion, ask questions, raise alternate viewpoints, and mention other related literature. The preparation of these presentations should not be excessive, but the expectation is that you will be reading the original article and a sufficient/appropriate number of other papers (roughly 4 - 10 papers) to develop a good understanding of the immediate field of the paper. You are expected to briefly summarize the paper. The significant portion of your presentation, however, should be a critical analysis of the paper in which you guide the discussion.

Evaluation

Following faculty discussion, speakers will receive a grade of Satisfactory or Unsatisfactory. Seminars will be evaluated on the following points:

- Do you correctly identify the scientific problem being addressed in this paper? Do you correctly identify the novelty (i.e. hypothesis, scientific results, device, etc) that the paper contributes to the field? Please be sure to provide context to this by citing previous and contemporary literature that also addresses a similar or same scientific problem in the field.
- Do you correctly identify the central hypothesis (explicit or implicit) of the paper? What previous literature precedents or experimental data in the paper lead to the formulation of the hypothesis of the paper?
- Do you provide a critical analysis of the experiments and methods used in the paper to address the overall scientific problem and hypothesis being examined? Do you discuss what control experiments the authors perform? How do the methods used in the paper compare to alternative techniques? What are the advantages and disadvantages of the techniques compared to other methods? Please cite examples from the scientific literature to contextualize your response.

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- On the basis of the findings of this paper, what future directions or new scientific problems do you anticipate can be pursued? Do you explain why these new scientific problems are interesting for the field?
- Do you use appropriate language and have polished oral presentation style? Do you describe concepts in a non-casual but accessible vernacular? Have you followed the appropriate timeline listed in this syllabus in terms of selecting and submitting your paper and submitting your slides?

Please note: Your ability to answer detailed questions pertaining to the scientific content of the paper is not an explicit criterion that faculty will consider during the evaluation. You are not expected to be an expert on the scientific material presented in the paper. However, during the Q&A session, it can become apparent when the student does not understand the main point of the paper, the hypothesis, scientific results, cannot perform a reasonable critical analyses, and/or is unable to meet other graded criteria listed above, and in those cases, the Q&A then indirectly may affect some people's grades as a result.

General Attendance, Participation Policies, and Expectations

Attendance/participation in this course is mandatory. If you are signed up for credit, you will not be able to pass if you do not actively participate, ask questions, or engage in scientific discussions when not presenting. The UVM attendance policy outlines expectations for attendance.

Excused Absence Policies

- Religious Holidays: Students have the right to practice the religion of their choice. If you need to miss class to observe a religious holiday, please submit the dates of your absence to me in writing by the end of the second full week of classes. You will be permitted to make up work within a mutually agreed-upon time frame. <https://www.uvm.edu/registrar/religious-holidays>
- Inter-collegiate Athletics: Members of UVM varsity and junior varsity teams are responsible for documenting in writing any conflicts between their planned athletic schedule and the class schedule by the end of the 2nd full week of classes. You will be permitted to make up work within a mutually agreed-upon time frame.
- Medical and Emergency Absences: Absences due to sickness, as well as medical and family emergencies, should be brought to my attention as soon as possible. You will be permitted to make up work within a mutually agreed-upon time frame.
- Other Absences: Absences due to extracurricular or other activities not specified above should be brought to my attention as soon as possible so that we can work out an arrangement to make up work.

COVID-specific Policies

The University of Vermont reserves the right to make changes in the course offerings (<http://catalogue.uvm.edu/>), mode of delivery, degree requirements, charges, regulations, and procedures contained herein as educational, financial, and health, safety, and welfare considerations require, or as necessary to be compliant with governmental, accreditation, or public health directives.

Email Policy

Students are encouraged to email me directly to clarify any questions they may have in the course. The subject line of emails should only contain the words "CHEM6050C." Emails will be filtered using this subject line to ensure that they are not mistakenly missed. I may miss emails that do not contain these words in the subject line.

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Recording Policy

Our class sessions may be audiovisually recorded for students in the class to refer back to, and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the “chat” feature, which allows students to type questions and comments live.

Important University Policies

Academic Integrity

Offenses against the Code of Academic Integrity are deemed serious and insult the integrity of the entire academic community. Any suspected violations of the code are taken very seriously and will be forwarded to the Center for Student Ethics and Standards for further investigation. Violations of the Code of Academic Integrity—including any inappropriate collaboration, collusion, cheating, corroboration, plagiarism, or any other related offense—will be fully investigated according to the rules set by the UVM Academic Integrity Office and may be punishable with a score of zero for the assignment in question. Details can be found at <http://www.uvm.edu/policies/student/acadintegrity.pdf>.

Grade Appeals

If you would like to contest a grade, please follow the procedures outlined in this policy: <https://www.uvm.edu/policies/student/gradeappeals.pdf>

Code of Student Conduct

<http://www.uvm.edu/policies/student/studentcode.pdf>

FERPA Rights Disclosure

The purpose of this policy is to communicate the rights of students regarding access to, and privacy of their student educational records as provided for in the Family Educational Rights and Privacy Act (FERPA) of 1974. <http://catalogue.uvm.edu/undergraduate/academicinfo/ferparightsdisclosure/>

Promoting Health and Safety

The University of Vermont's number one priority is to support a healthy and safe community: Center for Health and Wellbeing <https://www.uvm.edu/health>
Counseling & Psychiatry Services (CAPS): Please call 802-656-3340 for assistance.

C.A.R.E. If you are concerned about a UVM community member or are concerned about a specific event, we encourage you to contact the Dean of Students Office (802-656-3380). If you would like to remain anonymous, you can report your concerns online by visiting the Dean of Students website at <https://www.uvm.edu/studentaffairs>

Alcohol and Cannabis Statement

As a faculty member, I want you to get the most you can out of this course. You play a crucial role in your education and in your readiness to learn and fully engage with the course material. It is important to note that alcohol and cannabis have no place in an academic environment. They can seriously impair your ability to learn and retain information not only in the moment you may be using, but up to 48 hours or more afterwards. In addition, alcohol and cannabis can:

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- Cause issues with attention, memory and concentration
- Negatively impact the quality of how information is processed and ultimately stored
- Affect sleep patterns, which interferes with long-term memory formation

It is my expectation that you will do everything you can to optimize your learning and to fully participate in this course.

Student Resources

Students, please read this technology check list to make sure you are ready for classes. Students should contact the Helpline (802-656-2604) for support with technical issues.

Research and Citation Help

For help selecting research topics, finding information, citing sources, and more, ask a librarian. Although they are working remotely, librarians are always eager to help. You may ask questions by phone, e-mail, chat, or text, or make an appointment for an individual consultation with a librarian.

- Howe Library: <https://library.uvm.edu/askhowe>
- Dana Medical Library: <https://dana.uvm.edu/help/ask>
- Silver Special Collections Library: <https://specialcollections.uvm.edu/help/ask>

Student Learning Accommodations

In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact SAS, the office of Disability Services on campus. SAS works with students and faculty in an interactive process to explore reasonable and appropriate accommodations, which are communicated to faculty in an accommodation letter. All students are strongly encouraged to meet with their faculty to discuss the accommodations they plan to use in each course.

Contact SAS:

A170 Living/Learning Center 802-656-7753 access@uvm.edu <https://www.uvm.edu/access>

Diversity, Equity, and Inclusion Resources

The Division of Diversity, Equity, and Inclusion Center believes excellence should be inclusive of the entire University of Vermont (UVM) community and is steadfastly committed to this belief. Every day, our Division strives to make our work accessible, affirming, and action-oriented to help ensure excellence is inclusive of everyone. <https://www.uvm.edu/diversity>

UVM Prism Center

The Prism Center serves the diverse queer and trans communities at the University of Vermont. We support and empower lesbian, gay, bisexual, transgender and queer students, as well as students whose identities fall in between or expand beyond those categories, and work to create a campus community where people of all sexual and gender identities can thrive. <https://www.uvm.edu/prism>

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Interfaith Center

Each of us engages those questions differently, perhaps through a religious tradition, philosophy, or spiritual practice. No matter how you make meaning of your life, you are welcome at the Interfaith Center for reflection, spiritual practice, education, and community building. <https://www.uvm.edu/interfaithcenter>

Mosaic Center for Students of Color

The Mosaic Center for Students of Color (MCSC) Vision is to create a diverse and rich community of empowered, engaged, and enthusiastic students of color at UVM. We fully support the holistic development of self-identified students of color so that they can obtain their goals for academic achievement, personal growth, identity formation, and cultural development. <https://www.uvm.edu/mcsc>

Women & Gender Equity Center

The UVM Women & Gender Equity Center cultivates joyful community while advancing gender equity across identities. We envision a brave, diverse, and equitable learning environment for all members of the UVM community. We provide advocacy services for those in our community who have experienced sexual or intimate partner violence, and strive to provide programming, education, and events that ask our community to explore the intersections of their gender and other identities. <https://www.uvm.edu/wagecenter>

Tips for Success

Students are encouraged to attend class, work with peers, and ask questions to help them succeed in class. In case the course goes fully online, here are a few resources for students on remote/online learning:

- Checklist for success in <https://learn.uvm.edu/about/support-for-students/checklist-online-credit-courses/>
- Academic support for online courses: <https://www.uvm.edu/academicsuccess/online-learning-student-resources-remote-instruction>

Helpful resources include the Undergraduate/Graduate Writing Center, Supplemental Instruction, Learning Co-op tutors, and supplemental course materials.)